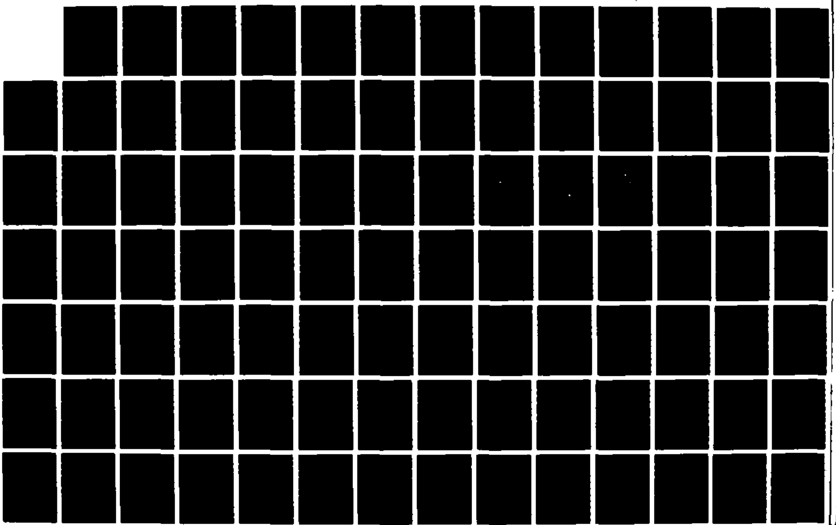
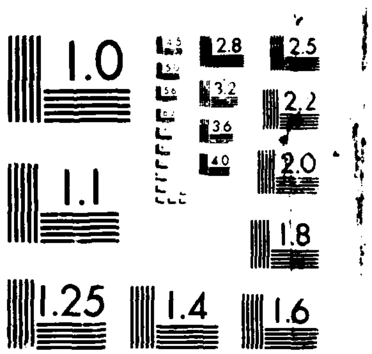
AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86 1/7

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL





MICROCOPY RESOLUTION TEST CHA
NATIONAL BUREAU OF STANDARDS 196

1

DRIFT OF ZOOPLANKTON, BENTHOS, AND LARVAL FISH AND DISTRIBUTION OF MACROPHYTES AND LARVAL FISH DURING WINTER AND SUMMER, 1985

D.J. Jude, M. Winnell, M.S. Evans,
F.J. Tesar, and R. Futyma

Prepared under Contract DACW 35-85-C-0005
for U.S. Army Corps of Engineers, Detroit District,
Detroit, Michigan 48231

Great Lakes Research Division
The University of Michigan
Ann Arbor, Michigan 48109

January 1986

ACKNOWLEDGMENTS

We are indebted to the many colleagues who assisted in the collection of data for this study under many times hazardous winter and cold spring conditions. Winter drift sampling was made tolerable by our resident ombudsman Glen Tompkins, who purchased equipment, scouted resting sites, and whose knowledge of the area facilitated sampling immensely. Others performing yeoman's duty during winter included: Curt Ritter, Heang Tin, Jim Wojcik. Spring larval fish sampling was conducted with the able assistance of Phil Schneeberger, Phil Hirt, Heang Tin, Mary Sweeney and Pam Mansfield. Summer drift collections were made with help from Mary Sweeney and Phil Hirt. Chuck Elzinga assisted with macrophyte collections. Heang Tin processed most larval fish samples. Benthos samples were processed by Connie Achtenburg, Jim Wojcik, Roger LaDronka, Chuck Elzinga, and Heang Tin. Zooplankton samples were counted by Mohammed Omair and biomass data generated by Phil Hirt and Mary Sweeney. We gratefully acknowledge the data entry and computer work provided by Connie Achtenburg.

We thank Tom Edsall of the Great Lakes Fishery Laboratory for permission to use some of their sampling gear and Tom Poe, Jarl Hiltunen, and Chuck Hatcher for good advice on how to sample and what conditions to expect. We thank H.K. Soo of the Great Lakes Environmental Research Lab for use of their current meter during winter and the Dearborn campus, University of Michigan, for use of their current meter during summer. Al Ballert of the Great Lakes Commission provided information for our report and Captain Taylor of the U.S. Coast Guard in Sault Ste. Marie provided advice and radio contact for safety purposes. The University of Michigan Biological Station provided the use of their Boston Whaler and vehicles for macrophyte sampling during summer and various pieces of equipment for our winter activities. We thank Claire Schelske for use of the photometer for our summer measurements.

Mary Sweeney, Heang Tin, and Scott DeBoe provided figures for the report, and Bev McClellan processed some tables. We gratefully acknowledge the contribution that Pam Mansfield made in putting together and producing the final report. This project was funded by the U.S. Army Corps of Engineers, Detroit District.

TABLE OF CONTENTS

INTRODUCTION

The St. Marys River, the connecting channel between Lake Superior and Lakes Huron and Michigan, is part of the vast surface waters of the Great Lakes and therefore bears a considerable amount of recreational boat and commercial ship traffic. Several questions have been raised regarding the impact of large ship passage on the indigenous fish and wildlife. In ~~addition~~, extended winter operation of the lock complex at Sault Ste. Marie, Michigan has been proposed to 31 January ± 2 wk. This contract (DACW 35-85-C-0005) was prepared by the U.S. Army Corps of Engineers, Detroit District, to obtain data to allow predictions regarding the impact of winter shipping to as late as 15 February on the St. Marys River. The results will be incorporated into a supplemental environmental impact statement concerning extension of the operating season of the lock facilities at Sault Ste. Marie to 31 January ± 2 wk. Because of the surge and currents that ships can generate, they may have substantial effects on the spawning grounds of such important fish as lake whitefish (*Coregonus clupeaformis*), lake herring (*C. artedii*), and other recreationally important species. There is also concern about the effects of ship passage on benthic invertebrate communities, and how sediment resuspension, possibly caused by ship traffic, may impact the primary producers in the system, especially the aquatic macrophytes.

The fauna of the St. Marys River is a combination of animals drifting or moving in from Lakes Superior, Huron, and Michigan and those produced within the system. The river includes backwater areas; connecting channels, embayments, and lakes; scattered wetlands; and other estuarine habitat.

To examine some of the impacts of winter and summer navigation on the indigenous fauna and flora, we studied three components of the St. Marys River ecosystem: the macrophyte community, the drifting benthos and zooplankton community, and the larval fish community. The macrophyte studies were aimed at determining how far the natural boundary of plant growth extended into the river. We also collected a series of spatially and temporally spaced light measurements in the river to obtain some information on light extinction coefficients, thereby establishing what turbidity currently exists in the St. Marys River and how that might affect or limit plant growth.

The second thrust of the study was aimed at documenting invertebrate drift in the St. Marys River during winter ice cover and during summer. For this purpose, sampling stations were established along three transects across the river. Several depth strata were sampled at each of these transects. Drift samples were collected with two different mesh sizes to efficiently sample both the benthos and zooplankton. Sampling

was performed during the day and night so no major periods of peak drift would be missed. All invertebrates were removed from the sample as well as plant fragments, detritus, and fish larvae. All organisms from each of these groups were then weighed and biomass determined. Lastly, we conducted larval fish sampling in the spring to attempt to document lake herring and lake whitefish spawning grounds in the St. Marys River. Stations were located from the power canal in Sault harbor to south Neebish Island and sampled at night to reduce net avoidance. Depths sampled at each station included 1 m, 2 m, and surface to bottom in the channel. One station was located near the head of the St. Marys River where Lake Superior enters, to establish whether fish larvae were drifting in from Lake Superior or Izaak Walton Bay. Results from these studies were used to draw conclusions regarding the impact ship passage might have on the respective components of the aquatic ecosystem.

METHODS

MACROPHYTES

All sampling was done from a 5-m Boston Whaler motor boat equipped with a Datamarine electronic depth finder. To locate the maximum depth to which submerged macrophyte beds extended at a site, samples of bottom-growing plants were taken with a grappling hook along several transects perpendicular to the depth contours. This estimate was refined by using a Ponar grab-sampler to take a number of bottom samples, each covering approximately 620 cm^2 of substrate, at depths within about ±0.6 m of the original estimate. After assigning a depth to the outer boundary of macrophyte beds, the boat was moved over that depth contour for a distance of 1 km, and Ponar grab-samples were taken at intervals of approximately 30 m, for a minimum of 30 samples. In practice, sampling was done over a depth range within 0.5 m of the estimated boundary depth. Plants retrieved in each sample were placed in a labeled plastic bag and were later identified in the laboratory. Specimens were identified with the aid of manuals by Fassett (1957), Voss (1972), and Prescott (1962), and the herbarium of the University of Michigan Biological Station, Pellston, MI.

During the same day that bottom sampling at the outer macrophyte boundary was done, and on four other occasions, light penetration measurements were taken over plant beds in three locations in the vicinity of the 1-km transect in each of the five portions of the river. A LI-COR model LI-185 quantum meter was used to measure energy flux at photosynthetically active wavelengths (400-700 nm). Measurements were taken at the water surface, at 1-m depth intervals, and at the maximum depth (which depends on site, ca. 20 cm above the bottom) to which the light sensor could be lowered. The data from each light-measurement location were used to calculate vertical light extinction coefficients by the least square-methods (Lind 1979).

Five sites along the length of the river were chosen for study, one in each of the following parts of the river: Izaak Walton Bay (Mosquito Bay), Lake Nicolet, western Lake Munuscong, eastern Lake Munuscong, and the Raber Bay--Maud Bay area (see Fig. 1). Plant sampling and light measurements were done during July and August 1985.

BENTHOS

Samples of the macrophytic, zooplanktonic, benthic, fish larvae, and fish egg drift were collected during a period of ice

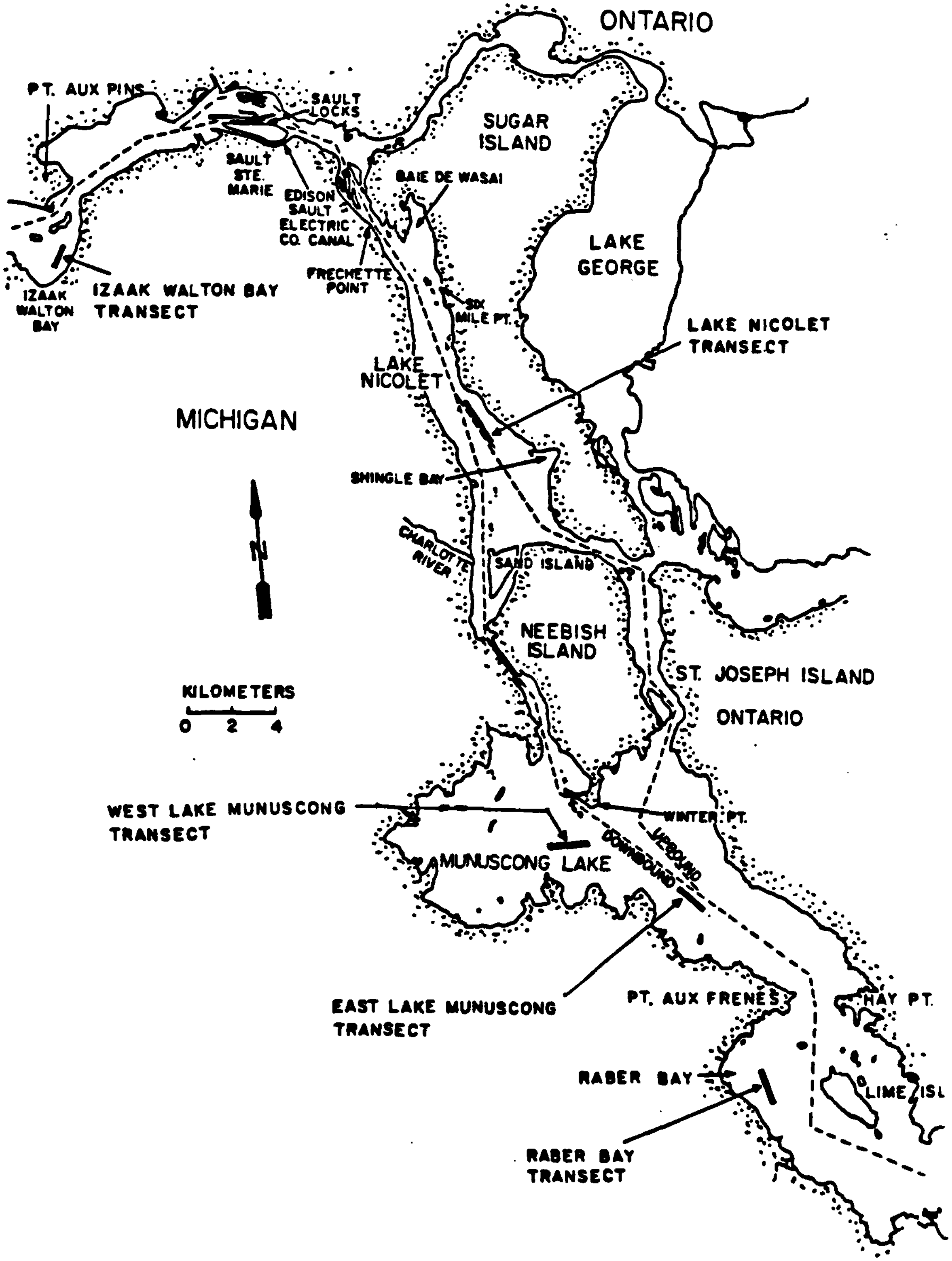


Figure 1. Location of transects where the depth boundary of submerged macrophytes and light penetration were measured in the St. Marys River, 1985.

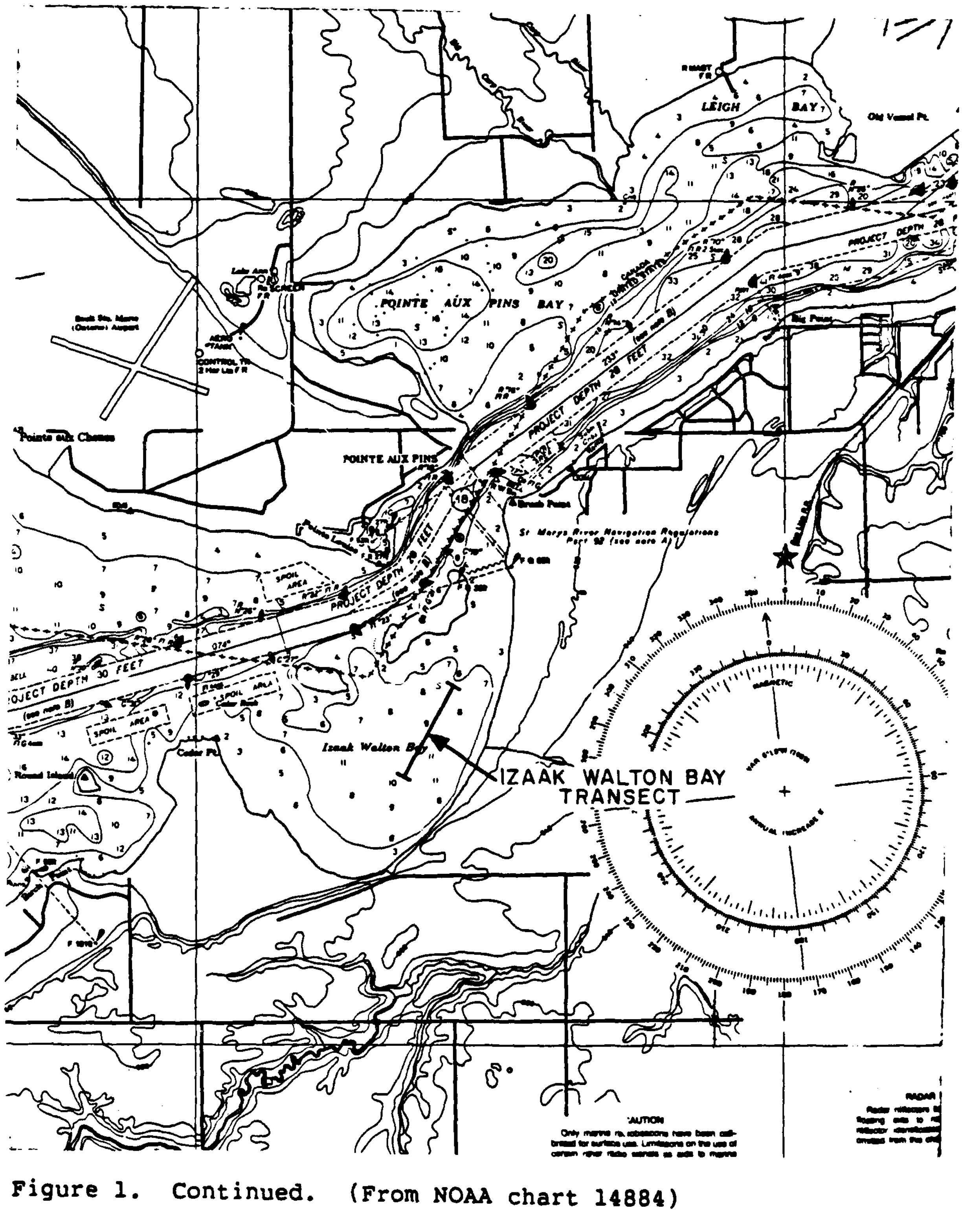


Figure 1. Continued. (From NOAA chart 14884)

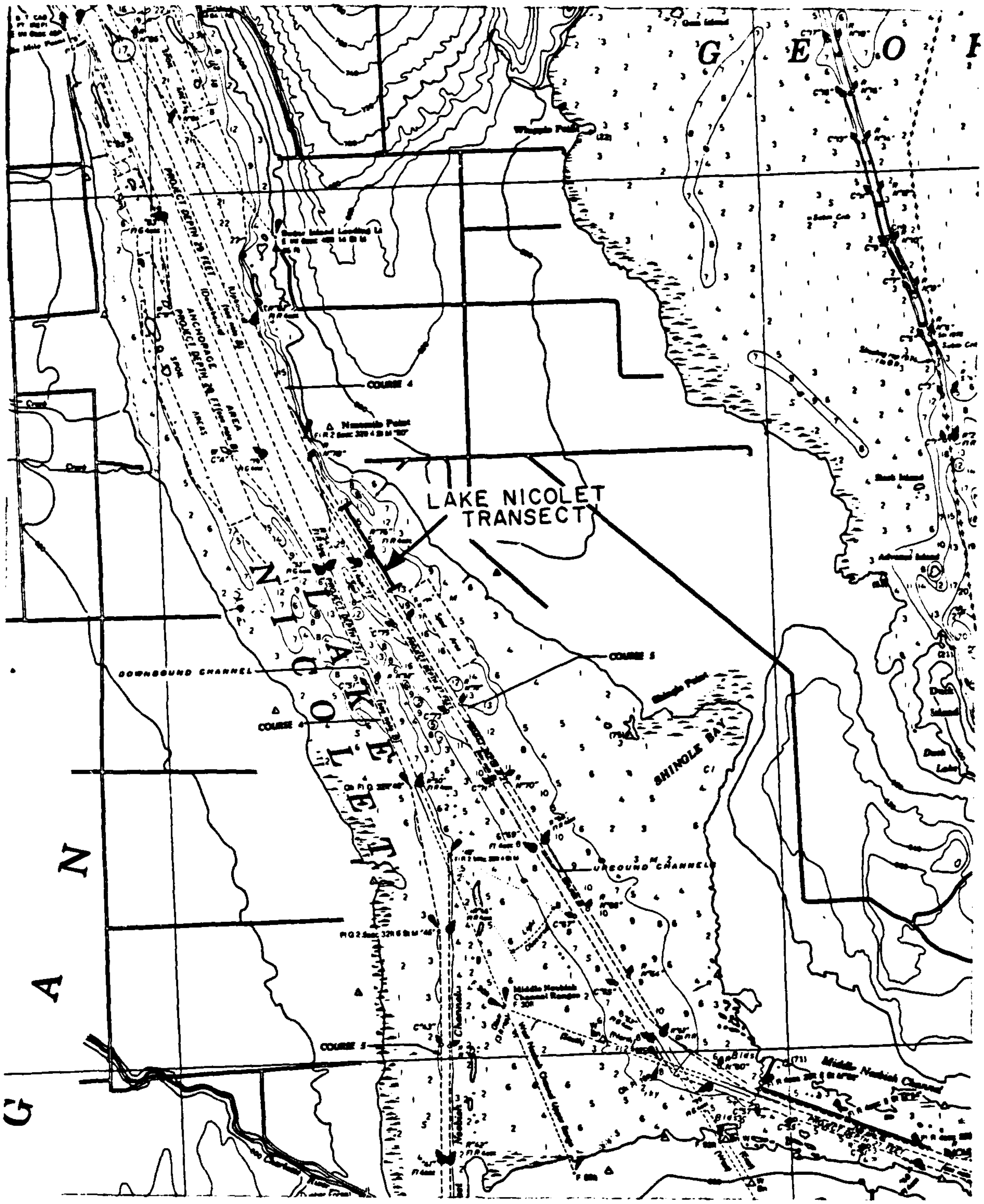


Figure 1. Continued. (From NOAA chart 14883)

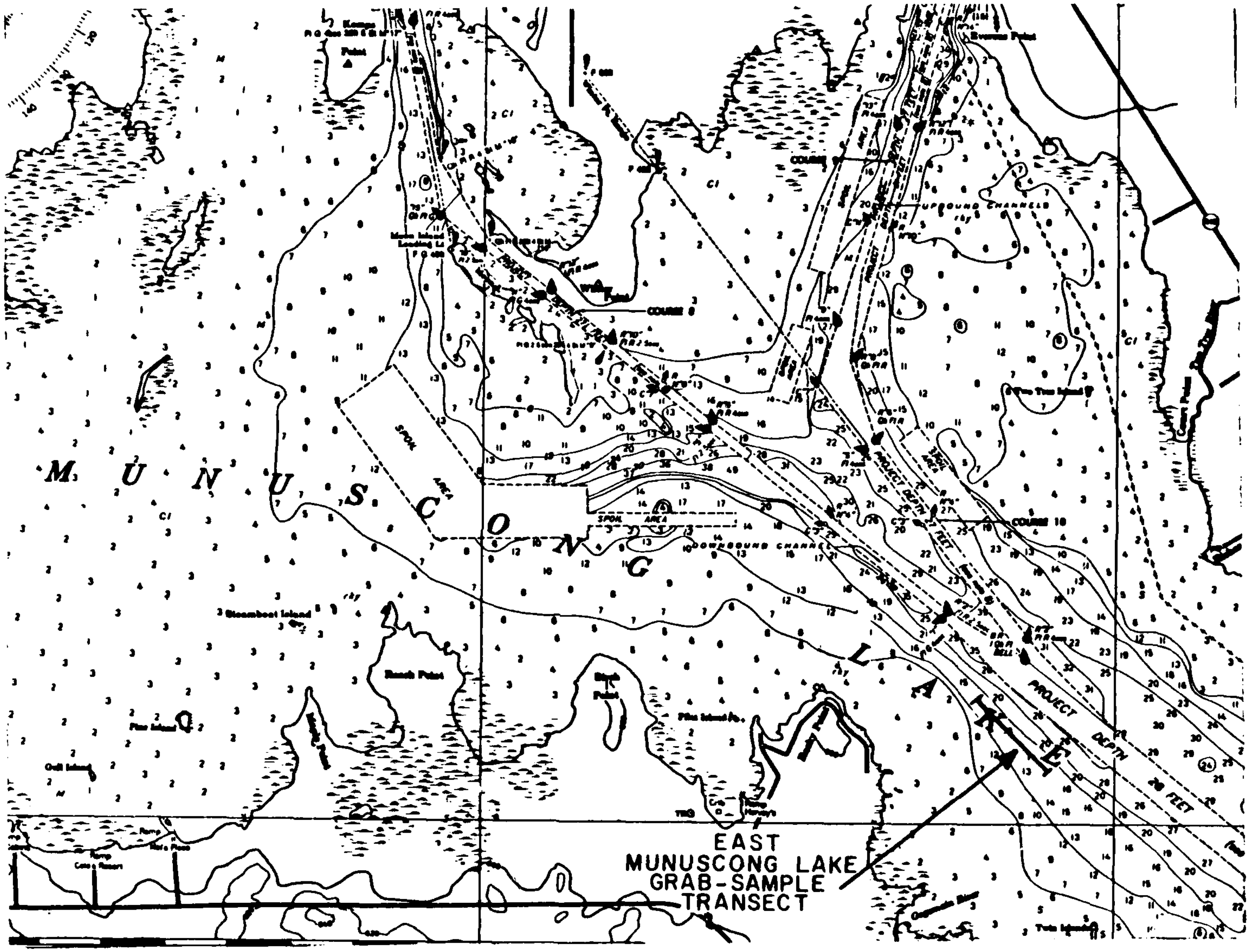


Figure 1. Continued. (From NOAA chart 14883)

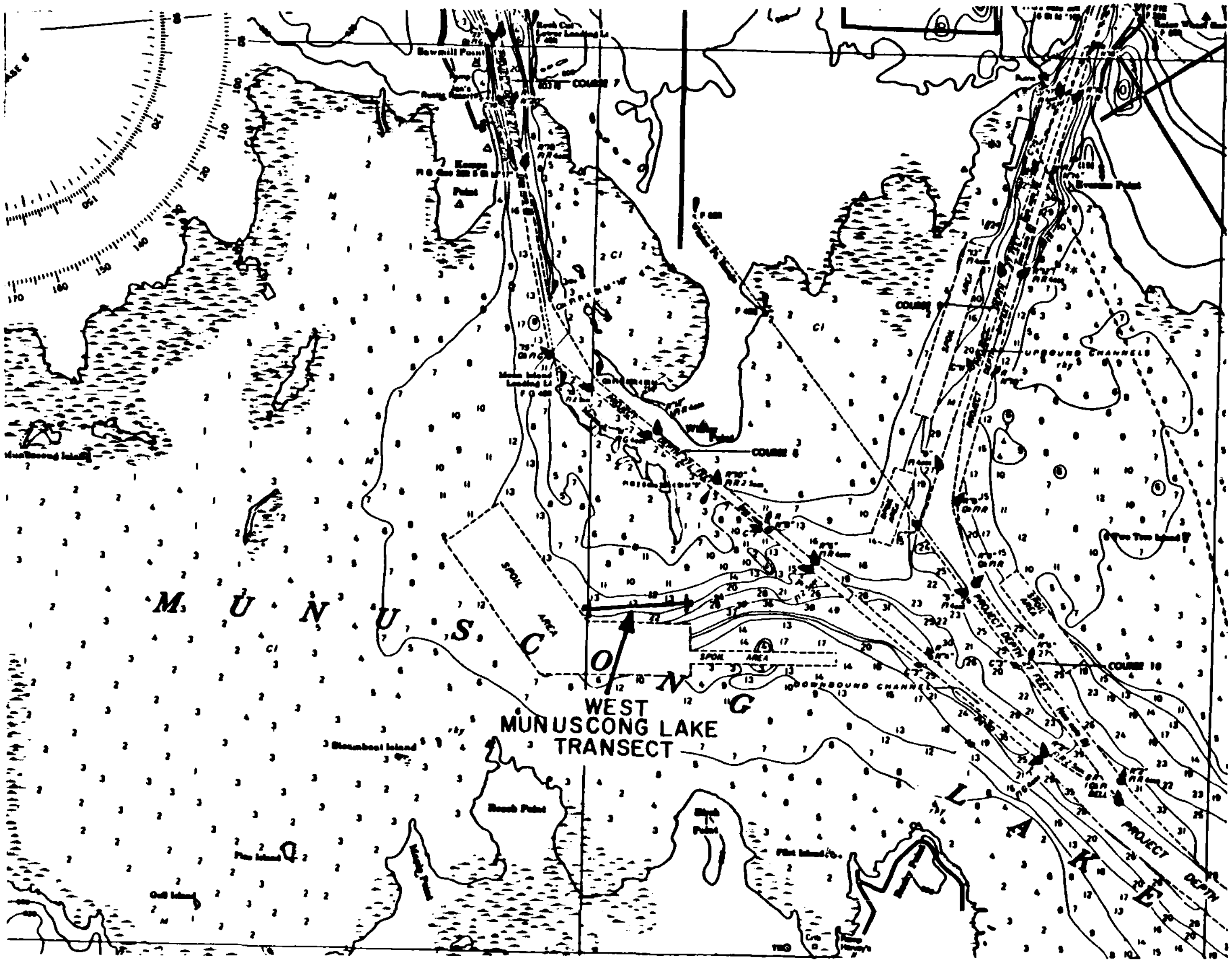


Figure 1. Continued. (From NOAA chart 14883)

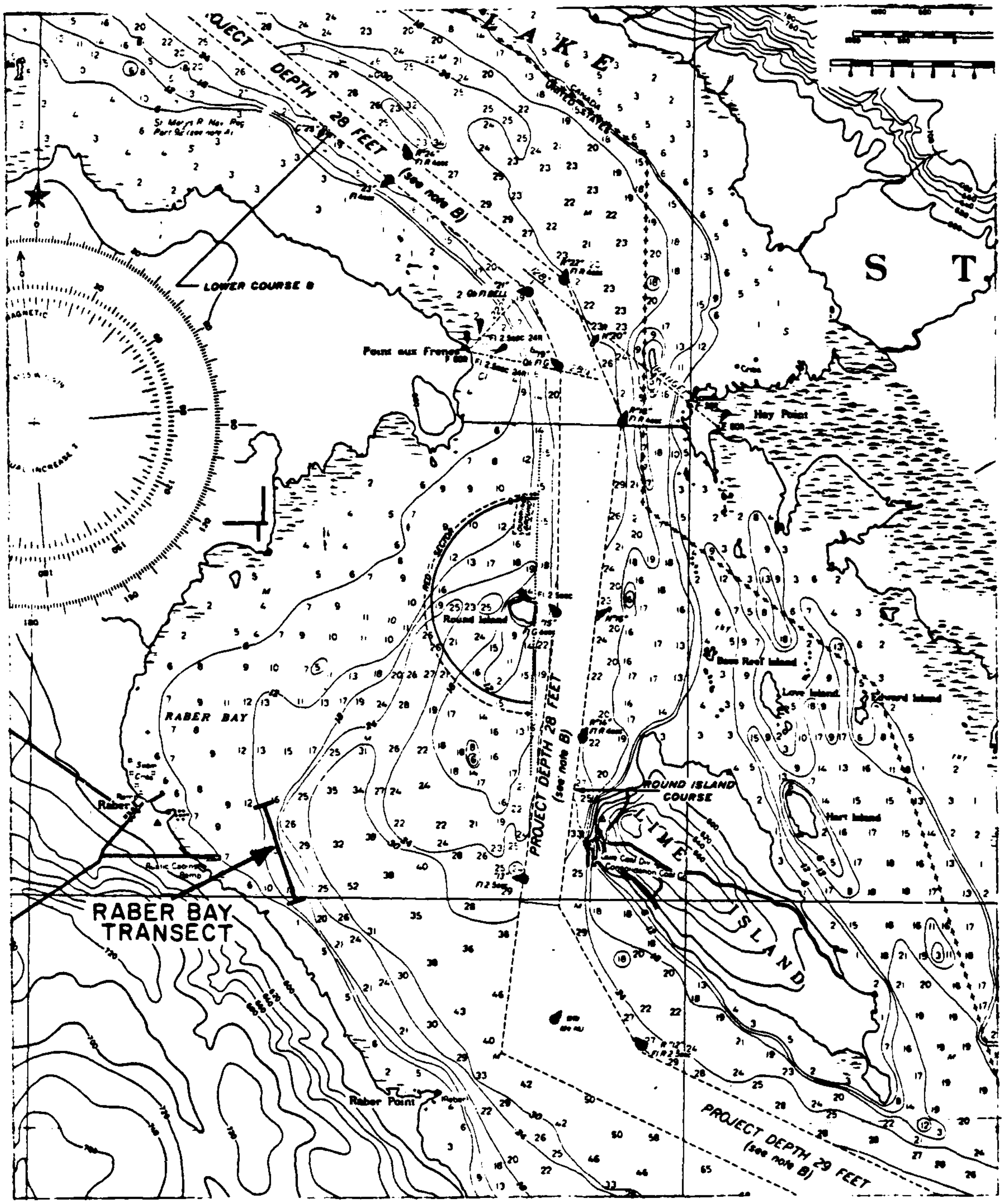


Figure 1. Continued. (From NOAA chart 14882)

cover (23 February - 7 March 1985) and during a period free of ice (2-14 June 1985) from transects located at Frechette Point, lower Lake Nicolet, and Point aux Frenes (Lake Munuscong) on the St. Marys River (Fig. 2). At the Frechette Point and Pt. aux Frenes transects, sample stations were established at 1-, 2-, and 3-m depths on either side of the navigation channel for a total of six stations at each transect. A seventh station at each site was located in the navigation channel at a water depth of 9-10 m. Because the navigation channel is divided into upbound and downbound channels in lower Lake Nicolet, the number of stations was increased to nine. Similar to the two previous transects, stations were located at 1-, 2-, and 3-m depths on the shoreward side of both channels, and a station was established in each navigation channel. A final station was located at 2 m in the central area of the lake between the two channels. Although a total of 988 drift samples were scheduled to be collected, the final number of samples collected was 964.

The vertical water column was sampled for drift at sub-surface, mid-depth, and near-bottom locations, dependent upon station depth. At 1-m stations, drift samples were collected near bottom. At 2- and 3-m stations, samples were collected at mid-depth and near bottom. Finally, at all navigation channel stations, samples were collected from all three water depth locations.

Two simultaneous replicates were collected at each vertical water depth at each station during approximate 12-h time periods corresponding to Day 1, Night 1, Day 2, and Night 2. Day sampling generally occurred between 1000 and 1700 h, while winter night sampling occurred between 1900 and 2300 h and summer night sampling between 2200 and 0200 h.

The drift at all stations was sampled with nets that were 1-m in length and 29 cm at the mouth, with openings of 355 μm. In addition, the drift at all 3-m and navigation stations during Day 1 and Night 1 time periods was sampled using a similarly sized drift net but of finer mesh size (153 μm). At all stations excluding navigation channel sites, nets of similar mesh size were attached at the top and bottom of the net ring to crossrods by slipping the crossrods through the rope which secured the net to the ring (Fig. 3). Each net was clipped to the center pole such that it was attached at three locations. After U.S. Fish and Wildlife Service (Poe and Edsall 1982), the crossrods were fastened to a sleeve such that the whole apparatus, including nets, rotated about a central, 16-mm, T6160 aluminum support rod. Depending on the vertical water depth required, set-screw stops were affixed above and below the crossrod apparatus to prevent vertical movement. In the winter, 0.3- by 1-m rectangular holes were bored into the ice using a gas-powered auger. The sampling unit with nets attached was then lowered into the water and

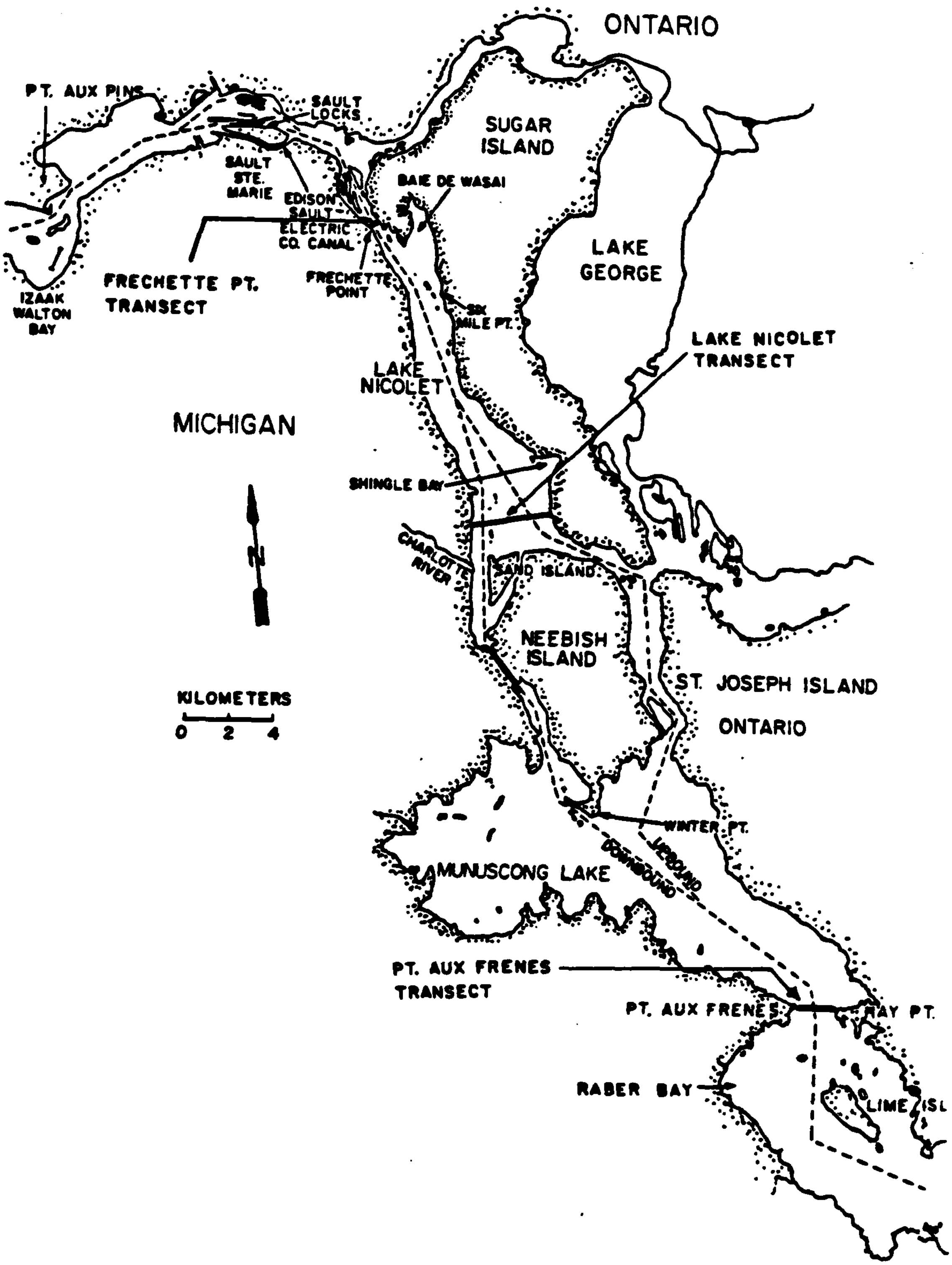
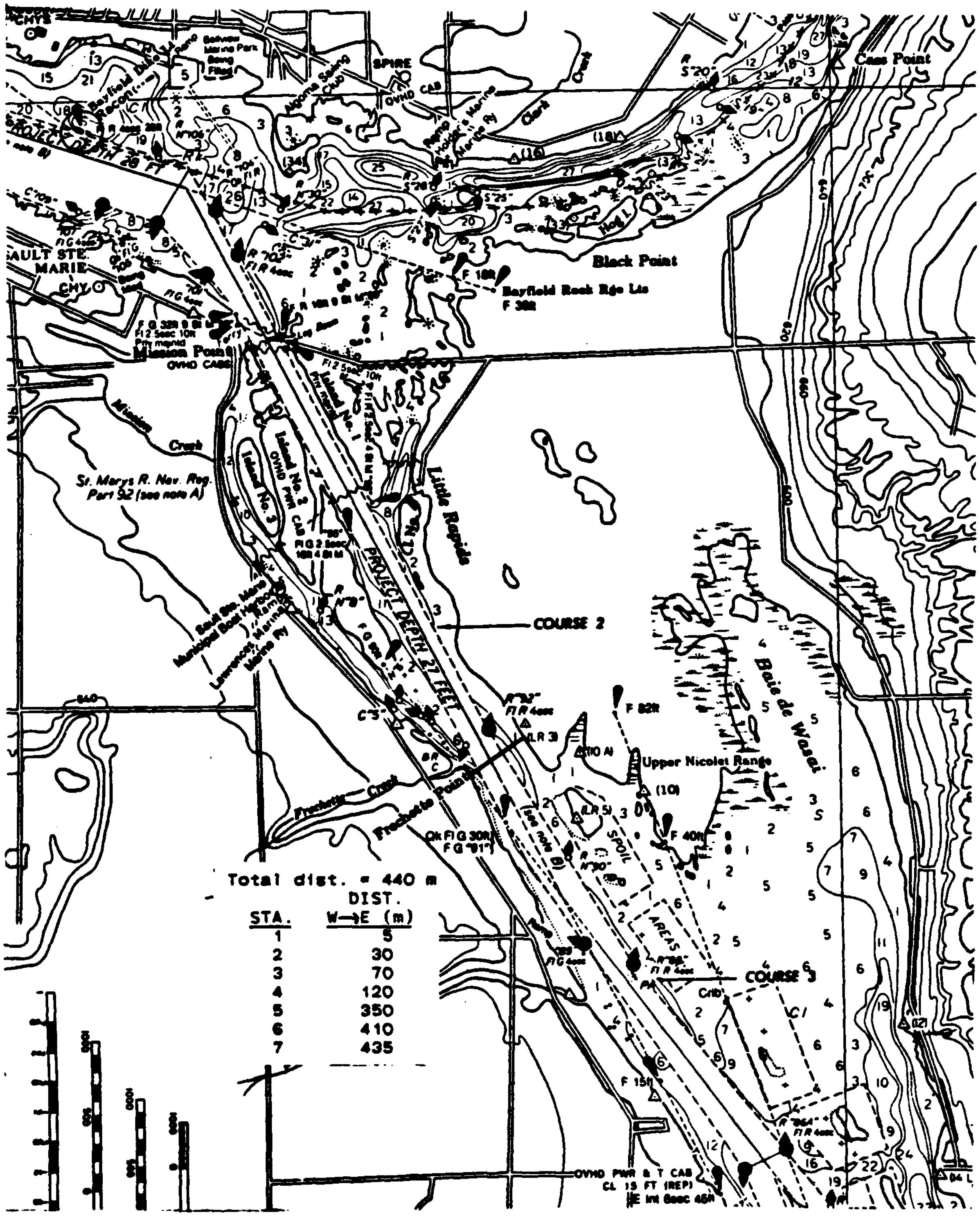


Figure 2. Location of transects where benthic drift was sampled in the St. Marys River, 1985.



STA.	DIST. W→E (m)
1	5
2	30
3	70
4	120
5	350
6	410
7	435

Figure 2. Continued. (From NOAA chart 14883)

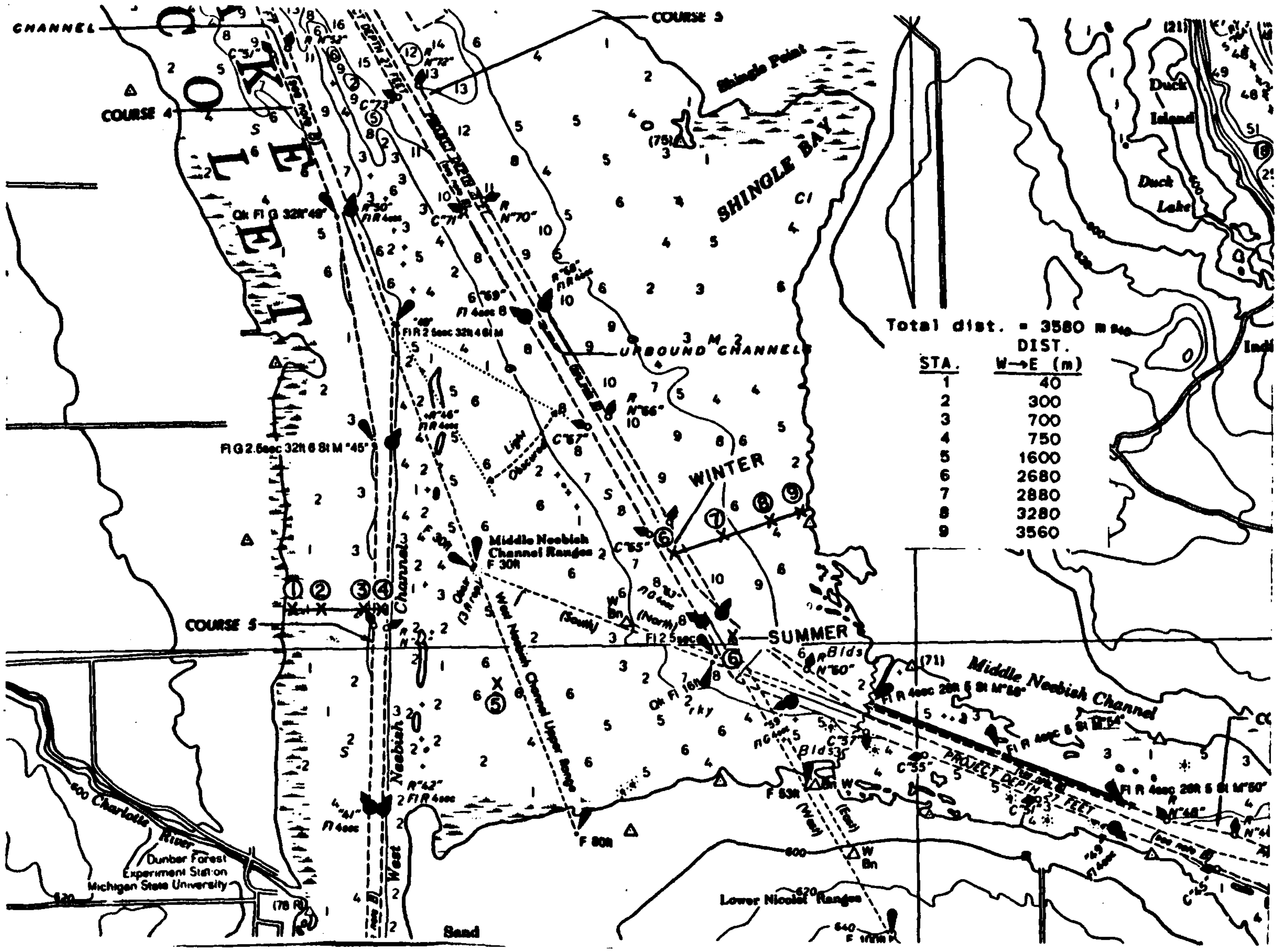


Figure 2. Continued. (From NOAA chart 14883)

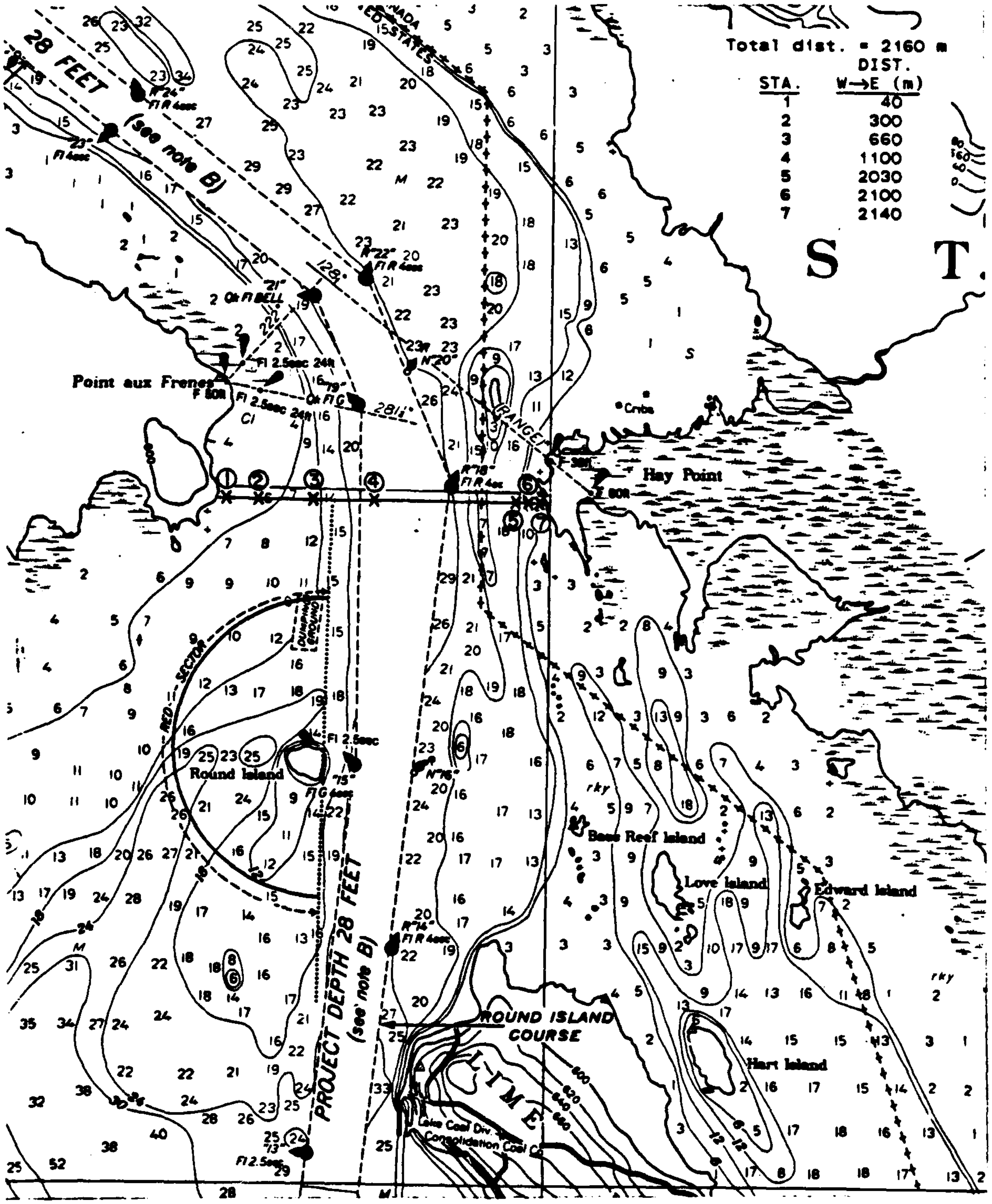


Figure 2. Continued. (From NOAA chart 14882)

pushed 10-20 cm into the river bottom. Surface ice acted as support such that the pole with nets attached remained upright. During the summer sample period, a 1- by 1-m base was constructed through which the central, aluminum support rod extended 10-20 cm. When lowered into the water the weight and size of the base as well as the sinking of the rod into the river bed adequately anchored the whole apparatus. At rocky sites, the support was extended 5-10 cm and the base was wedged among the rocks thereby anchoring the sample device securely even in rough weather conditions. At the top of each support rod and protruding out of the water was a float with fluorescent markings which functioned to shorten night-time searches and to warn and protect unsuspecting boaters.

In the navigation channel, the apparatus to which nets were affixed consisted of a 2-cm by 15-m nylon rope, a crossrod, two clips for each pair of replicate nets, and lead weights. Crossrods were stabilized by nylon string supports leading up the nylon rope at 45° angles from each end of the rod. Each net was clipped at the top and just below center at an angle of 120°. With ice cover, these sets were tied off at the surface to rods laid over the ice hole. In the summer, these sets were tied off to the sides of the 5-m Boston Whaler which was anchored in the channel.

At each sampling location, temperature and water current was determined. Water current was measured with a Marsh-McBirney Model No. 527 current meter in the winter. However, due to adverse weather conditions which caused the probe to freeze, current was determined during Day 1 sampling periods only for all transects except at Frechette Point where several measurements taken indicated little variation in winter current speed. During the summer sample period, a different Marsh-McBirney current meter failed to operate and was replaced by a Gurley-Fisher current meter.

Adverse weather conditions affected sampling schedules during both winter and summer periods making it impractical to adhere strictly to the original sampling scheme at Point aux Frenes and Lake Nicolet (Table 1). Extremely poor weather conditions and rough brash ice in the navigation channel prevented collection of 64 winter samples at stations 5 (24 samples), 6 (16 samples), and 7 (8 samples) at Point aux Frenes and at station 5 (16 samples) in lower Lake Nicolet. Additionally, these same weather conditions necessitated double setting nets, i.e., setting Day 1 and Day 2 nets on the same day or night period, at stations 1 (Day) and 2 (Night) at Point aux Frenes. During the summer sampling period, high winds and 0.6- to 1.2-m waves, especially at Point aux Frenes, required the double setting of day and night nets during the same day or night at all stations.

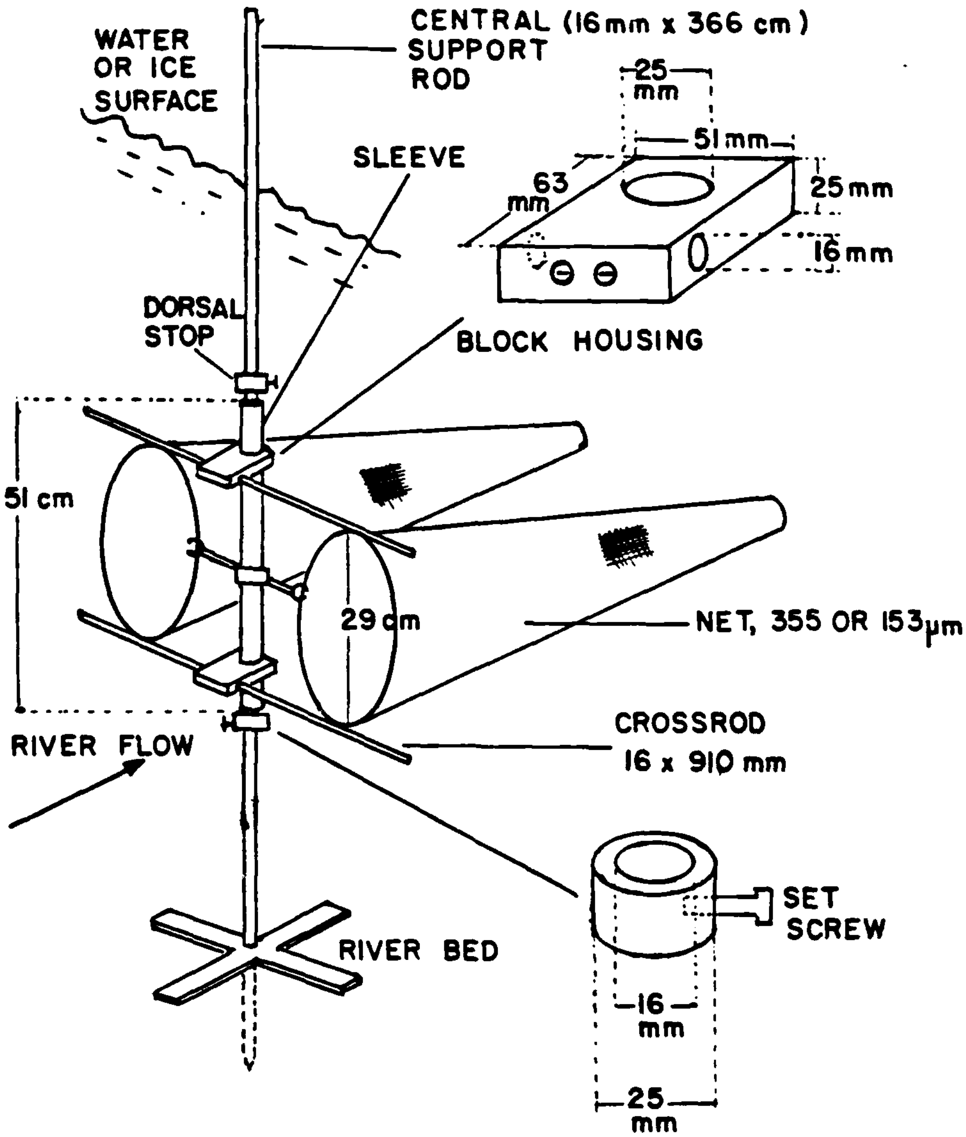


Figure 3. Apparatus used to sample drifting organisms in the St. Marys River. Shown is dual net arrangement mounted on a PVC sleeve which allowed rotation according to current direction. Nets were set without bottom support during the winter and with cross support during the summer.

Table 1. Benthic drift sampling dates for transect stations during winter and summer periods on the St. Marys River. FP = Frechette Point, LN = Lake Nicolet, PAF = Pt. aux Frenes, Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters. A dash means no sample collected.

Trans.	Sta.	Depth (m)	Depth strata	Mesh (μm)	Day 1	Night 1	Day 2	Night 2
FP	1	1.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
FP	2	1.0	Mid	355	23-Feb	23-Feb	24-Feb	24-Feb
		2.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
FP	3	1.5	Mid	355	23-Feb	23-Feb	24-Feb	24-Feb
		3.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
	3	1.5	Mid	153	23-Feb	23-Feb	-	-
		3.0	Bott	153	23-Feb	23-Feb	-	-
FP	4	0.5	Surf	355	23-Feb	23-Feb	24-Feb	24-Feb
		4.0	Mid	355	23-Feb	23-Feb	24-Feb	24-Feb
		8.2	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
	4	0.5	Surf	153	23-Feb	23-Feb	-	-
		4.0	Mid	153	23-Feb	23-Feb	-	-
		8.2	Bott	153	23-Feb	23-Feb	-	-
FP	5	1.5	Mid	355	23-Feb	23-Feb	24-Feb	24-Feb
		3.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
	5	1.5	Mid	153	23-Feb	23-Feb	-	-
		3.0	Bott	153	23-Feb	23-Feb	-	-
FP	6	1.0	Mid	355	23-Feb	23-Feb	24-Feb	24-Feb
		2.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
FP	7	1.0	Bott	355	23-Feb	23-Feb	24-Feb	24-Feb
LN	1	1.0	Bott	355	3-Mar	3-Mar	2-Mar	5-Mar
LN	2	1.0	Mid	355	3-Mar	3-Mar	2-Mar	5-Mar
		2.0	Bott	355	3-Mar	3-Mar	2-Mar	5-Mar
LN	3	1.5	Mid	355	3-Mar	3-Mar	2-Mar	5-Mar
		3.0	Bott	355	3-Mar	3-Mar	2-Mar	5-Mar
	3	1.5	Mid	153	3-Mar	3-Mar	-	-
		3.0	Bott	153	3-Mar	3-Mar	-	-
LN	4	0.5	Surf	355	3-Mar	3-Mar	2-Mar	5-Mar
		4.6	Mid	355	3-Mar	3-Mar	2-Mar	5-Mar

Table 1. Continued.

Trans.	Sta.	Depth (m)	Depth strata	Mesh (μm)	Day 1	Night 1	Day 2	Night 2
(LN)		9.2	Bott	355	3-Mar	3-Mar	2-Mar	5-Mar
	4	0.5	Surf	153	3-Mar	3-Mar	-	-
		4.6	Mid	153	3-Mar	3-Mar	-	-
		9.2	Bott	153	3-Mar	3-Mar	-	-
LN	5	1.0	Mid	355	-	-	-	-
		2.0	Bott	355	-	-	-	-
LN	6	0.5	Surf	355	6-Mar	6-Mar	7-Mar	7-Mar
		4.0	Mid	355	6-Mar	6-Mar	7-Mar	7-Mar
		8.2	Bott	355	6-Mar	6-Mar	7-Mar	7-Mar
	6	0.5	Surf	153	6-Mar	6-Mar	-	-
		4.0	Mid	153	6-Mar	6-Mar	-	-
		8.2	Bott	153	6-Mar	6-Mar	-	-
LN	7	1.5	Mid	355	6-Mar	6-Mar	7-Mar	7-Mar
		3.0	Bott	355	6-Mar	6-Mar	7-Mar	7-Mar
	7	1.5	Mid	153	6-Mar	6-Mar	-	-
		3.0	Bott	153	6-Mar	6-Mar	-	-
LN	8	1.0	Mid	355	6-Mar	6-Mar	7-Mar	7-Mar
		2.0	Bott	355	6-Mar	6-Mar	7-Mar	7-Mar
LN	9	1.0	Bott	355	6-Mar	6-Mar	7-Mar	7-Mar
PAF	1	1.0	Bott	355	28-Feb	26-Feb	28-Feb	27-Feb
PAF	2	1.0	Mid	355	28-Feb	28-Feb	27-Feb	28-Feb
		2.0	Bott	355	28-Feb	28-Feb	27-Feb	28-Feb
PAF	3	1.5	Mid	355	28-Feb	26-Feb	27-Feb	27-Feb
		3.0	Bott	355	28-Feb	26-Feb	27-Feb	27-Feb
	3	1.5	Mid	153	28-Feb	26-Feb	-	-
		3.0	Bott	153	28-Feb	26-Feb	-	-
PAF	4	0.5	Surf	355	27-Feb	26-Feb	28-Feb	27-Feb
		4.9	Mid	355	27-Feb	26-Feb	28-Feb	27-Feb
		9.8	Bott	355	27-Feb	26-Feb	28-Feb	27-Feb
	4	0.5	Surf	153	27-Feb	26-Feb	-	-
		4.9	Mid	153	27-Feb	26-Feb	-	-
		9.8	Bott	153	27-Feb	26-Feb	-	-
FP	1	1.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun

Table 1. Continued.

Trans.	Sta.	Depth (m)	Depth strata	Mesh (μm)	Day 1	Night 1	Day 2	Night 2
FP	2	1.0	Mid	355	2-Jun	2-Jun	3-Jun	3-Jun
		2.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
FP	3	1.5	Mid	355	2-Jun	2-Jun	3-Jun	3-Jun
		3.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
	3	1.5	Mid	153	2-Jun	2-Jun	-	-
		3.0	Bott	153	2-Jun	3-Jun	-	-
FP	4	0.5	Surf	355	2-Jun	2-Jun	3-Jun	3-Jun
		4.6	Mid	355	2-Jun	2-Jun	3-Jun	3-Jun
		9.2	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
	4	0.5	Surf	153	2-Jun	2-Jun	-	-
		4.6	Mid	153	2-Jun	2-Jun	-	-
		9.2	Bott	153	2-Jun	2-Jun	-	-
FP	5	1.5	Mid	355	2-Jun	2-Jun	3-Jun	3-Jun
		3.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
	5	1.5	Mid	153	2-Jun	2-Jun	-	-
		3.0	Bott	153	2-Jun	2-Jun	-	-
FP	6	1.0	Mid	355	2-Jun	2-Jun	3-Jun	3-Jun
		2.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
FP	7	1.0	Bott	355	2-Jun	2-Jun	3-Jun	3-Jun
LN	1	1.0	Bott	355	5-Jun	5-Jun	6-Jun	6-Jun
LN	2	1.0	Mid	355	5-Jun	5-Jun	6-Jun	6-Jun
		2.0	Bott	355	5-Jun	5-Jun	6-Jun	6-Jun
LN	3	1.5	Mid	355	5-Jun	5-Jun	6-Jun	6-Jun
		3.0	Bott	355	5-Jun	5-Jun	6-Jun	6-Jun
	3	1.5	Mid	153	5-Jun	5-Jun	-	-
		3.0	Bott	153	5-Jun	5-Jun	-	-
LN	4	0.5	Surf	355	5-Jun	5-Jun	6-Jun	6-Jun
		4.6	Mid	355	5-Jun	5-Jun	6-Jun	6-Jun
		9.2	Bott	355	5-Jun	5-Jun	6-Jun	6-Jun
	4	0.5	Surf	153	5-Jun	5-Jun	-	-
		4.6	Mid	153	5-Jun	5-Jun	-	-
		9.2	Bott	153	5-Jun	5-Jun	-	-
LN	5	1.0	Mid	355	5-Jun	5-Jun	6-Jun	6-Jun
		2.0	Bott	355	5-Jun	5-Jun	6-Jun	6-Jun

Table 1. Continued.

Trans.	Sta.	Depth (m)	Depth strata	Mesh (μm)	Day 1	Night 1	Day 2	Night 2
LN	6	0.5	Surf	355	6-Jun	6-Jun	7-Jun	7-Jun
		4.6	Mid	355	6-Jun	6-Jun	7-Jun	7-Jun
		9.2	Bott	355	6-Jun	6-Jun	7-Jun	7-Jun
	6	0.5	Surf	153	6-Jun	6-Jun	-	-
		4.6	Mid	153	6-Jun	6-Jun	-	-
		9.2	Bott	153	6-Jun	6-Jun	-	-
LN	7	1.5	Mid	355	7-Jun	7-Jun	8-Jun	8-Jun
		3.0	Bott	355	7-Jun	7-Jun	8-Jun	8-Jun
	7	1.5	Mid	153	7-Jun	7-Jun	-	-
		3.0	Bott	153	7-Jun	7-Jun	-	-
LN	8	1.0	Mid	355	7-Jun	7-Jun	8-Jun	8-Jun
		2.0	Bott	355	7-Jun	7-Jun	8-Jun	8-Jun
LN	9	1.0	Mid	355	7-Jun	7-Jun	8-Jun	8-Jun
PAF	1	1.0	Bott	355	11-Jun	11-Jun	12-Jun	11-Jun
PAF	2	1.0	Mid	355	11-Jun	11-Jun	12-Jun	11-Jun
		2.0	Bott	355	11-Jun	11-Jun	12-Jun	11-Jun
PAF	3	1.5	Mid	355	11-Jun	11-Jun	12-Jun	11-Jun
		3.0	Bott	355	11-Jun	11-Jun	12-Jun	11-Jun
	3	1.5	Mid	153	11-Jun	11-Jun	-	-
		3.0	Bott	153	11-Jun	11-Jun	-	-
PAF	4	0.5	Surf	355	13-Jun	14-Jun	13-Jun	14-Jun
		4.6	Mid	355	13-Jun	14-Jun	13-Jun	14-Jun
		9.2	Bott	355	13-Jun	14-Jun	13-Jun	14-Jun
	4	0.5	Surf	153	13-Jun	14-Jun	-	-
		4.6	Mid	153	13-Jun	14-Jun	-	-
		9.2	Bott	153	13-Jun	14-Jun	-	-
PAF	5	1.5	Mid	355	12-Jun	13-Jun	12-Jun	13-Jun
		3.0	Bott	355	12-Jun	13-Jun	12-Jun	13-Jun
	5	1.5	Mid	153	12-Jun	13-Jun	-	-
		3.0	Bott	153	12-Jun	13-Jun	-	-
PAF	6	1.0	Mid	355	12-Jun	13-Jun	12-Jun	13-Jun
		2.0	Bott	355	12-Jun	13-Jun	12-Jun	13-Jun
PAF	7	1.0	Bott	355	12-Jun	13-Jun	12-Jun	13-Jun

To compensate for uncollectable winter samples, a special summer study was devised which required the collection of 40 drift samples. The purpose of the study was to estimate the impact on drift of upbound and downbound passage of ships in excess of 213 m in length. This study was conducted during daylight hours on 10 June 1985 at station 3 at Frechette Point. Sampling was conducted in the same fashion as all previous drift sampling at Frechette Point except sampling was centered around passage of a ship using 153-μm mesh nets only. Replicate samples were collected at mid-depth and near-bottom during five periods corresponding to before ship passage, during ship passage, 5 min after ship passage, 10 min after ship passage, and 15 min after ship passage. Each period was approximately 5 min in duration. Between periods there was a 2-3 min lag during which nets were retrieved and reset. Current speed was monitored for the "before" period and continuously in 1-min intervals for the "during" period, but no current measurements were taken during the "after" periods. Additionally, for each ship, length, width, and draft were noted. Ship speed was estimated by timing ship passage from bow to stern past a fixed point directly opposite station 3. Utilizing this scheme, 20 samples were collected each for an upbound and a downbound ship passage.

All net contents were washed into labeled, 0.5-L Mason jars, preserved in 4% formaldehyde, and returned to the Benthos Laboratory. The collected drift was examined at 3-30X using stereo-zoom dissecting microscopes. Benthos, fish larvae, and fish eggs in the drift were identified and enumerated, with each component placed in labeled vials. All macrophytic material was removed and placed in labeled vials for identification in the Botany Laboratory. Remaining contents of each drift sample were again placed in 4% formaldehyde and taken to the Zooplankton Laboratory (Great Lakes Research Division) where final processing occurred. All benthos, fish larvae and egg, and macrophyte vials were taken to the Zooplankton Laboratory for dry weight and ash-free dry weight analyses.

All data initially recorded on raw data sheets stored in the Benthos Laboratory were coded and entered into a computerized data set in the University of Michigan's AMDAHL computer. All analyses were conducted using the Michigan Interactive Data Analysis System (MIDAS) which is a system of statistical analysis programs supported by the Statistical Research Laboratory at the University of Michigan. Comparisons of drift density differences were based on $\log_{10}(x+1)$ transformations of numbers per 1000 m^3 density estimates. Scheffe multiple comparisons ($\alpha = 0.05$) (Sokal and Rohlf 1969) were used to evaluate benthic and larval fish drift density differences among net types, transects, stations, depth strata, diel periods, and components of the ship passage study.

Drift rates were calculated for day and night periods during winter and summer at Frechette Point and Lake Nicolet. At Point aux Frenes, estimates were made only for the summer, because samples were not collected for the entire transect during winter. At each transect, the river cross-section was divided vertically (depth strata) and horizontally (stations). The area of each resultant subsection was estimated by station distance from shore and station depth. The area between adjacent stations was divided equally. The upper 0.5 m of the river cross-section was considered the surface depth stratum. The mid-depth stratum extended from 0.5 m deep to midway between the mid-depth net and the bottom net location. The remaining vertical portion of the river was assigned to the bottom depth stratum. Based on these areal approximations and by calculating an average current velocity and drift density for day and night periods at each river subsection during a given season, we estimated seasonal drift rate passing each of our transects (number of individuals/ 24 h) by summing day and night estimates derived from the following equation:

$$\text{Drift rate} = (\text{cm/s})(3600\ \text{s/h})(\text{h/d})(\text{m}^2)(\text{m}/100\ \text{cm})(\bar{X}\ \text{density}/1000\ \text{m}^3)$$

During the winter the daylight period was assumed to be 11 h and the night time was 13 h. During the summer the daylight period was 15 h and the night was 9 h in duration. Our discharge estimate (m^3/24 h) was calculated by removing the last term in the equation ($\bar{X}$ density/1000 m^3). Total drift rate and discharge passing each transect was calculated by summing appropriate values across all subsections and time periods within each season. Based on these sums, drift intensity was calculated from the total number of individuals passing per 24-h period divided by discharge expressed as m^3/s (Waters 1972).

ZOOPLANKTON

Identifications

Zooplankton in samples were identified to either genus or species. At most stations, zooplankton were identified to no higher than genus level. However, species identifications were conducted at station 3 at all three sampling sites.

For those collections where zooplankton were identified to the genus level, each sample was subdivided as many times as necessary in a Folsom Plankton Splitter to yield two subsamples of 200-250 animals each. For collections where zooplankton were identified to species, each sample was subdivided to yield two

subsamples of 100-150 animals each. Both subsamples were examined.

Zooplankton were examined in a circular counting dish under a Wild Stereozoom M8 microscope. Immature copepodites and cladocerans were identified to genus, while nauplii were combined as a group. Adult copepods and cladocerans were identified to species for station 3 samples collected during day 1 and night 1: sex determinations were made for adult copepods. At all other stations, identifications are to genus level. With the exception of *Asplanchna*, rotifers were not enumerated nor identified. All data were entered on coding sheets.

Biomass Determinations

Samples received in the Zooplankton Laboratory were split into three groups: plants, benthos, and fish larvae and fish eggs. Organisms were sorted and placed in separate labelled vials within the original sample jar. No fish larvae were collected during winter.

Dry weights and ash-free weights were determined for benthos, plants, and seston. The basic procedures were as follows.

Benthos- For most benthic samples, organisms were removed from the vial and washed several times in a petri dish of distilled water. All work was done under a Zeiss binocular microscope. Animals were enumerated and placed in preweighed 4-mm x 13-mm aluminum boats manufactured by Hewlett Packard. Boats were individually placed on numbered 26-mm diameter aluminum discs and dried in a desiccator (containing silica gel) over 2 days at room temperature. After 2 days, boats were reweighed on a Cahn electrobalance. The difference between the original and final weigh provided an estimate of the weight of benthic organisms in the original sample.

The boats and numbered discs were then placed in a muffle furnace and burned for 2 h at 450-500 °C. After cooling, the boats and numbered discs were removed from the furnace and reweighed on the electrobalance. The difference in weight after drying in the desiccator and burning in the furnace provided an estimate of the ash-free weight of benthos in the original sample.

On occasion, samples contained large numbers of benthos. In this case, weighing procedures for seston (see below) were followed.

Aquatic plants- When small amounts of plant material were present, vial contents were filtered on a prewashed and preashed 2.4-cm Whatman glass fiber filter. The sample was then washed several times with distilled water, placed on a numbered 2.6-cm diameter aluminum disc, and dried for 2 days at 55 °C in an oven. The filter was then reweighed on a Cahn electrobalance, placed back on its numbered disc, and burned in the muffle furnace. After cooling, the ashed sample was reweighed.

In practice, many plant samples contained small fragments of plant material which would better be designated as detritus. Thus, we defined plant material as larger, more intact plants and fragments.

In some cases, large amounts of plant material were present in samples. In these cases, plant material was removed, washed, and placed directly on preweighed, 5.0-cm diameter, numbered aluminum discs. Samples were desiccated for 2 days in the drying oven, reweighed, and then ashed in the muffle furnace for 2 h and reweighed. Most weighings were done on a Mettler balance.

Seston- Due to the large amount of material present in most samples, only subsamples of seston were weighed. During the subsampling procedure for zooplankton identifications, one subsample containing 600-1,000 animals was retained and placed in a labelled vial. This seston subsample was subsequently filtered with a 2.4-cm prewashed and preashed glass fiber filter. The sample was washed several times with distilled water and placed on a numbered 3.2-cm diameter aluminum disc. It was dried at 55 °C for 2 days in an oven, then the filter reweighed. The filter was placed back on its numbered disc and burned for 2 hours in the muffle furnace prior to final reweighing.

Zooplankton- Individual zooplankton dry weights were determined using the following procedure. Numerically dominant taxa were identified and samples selected for biomass determinations. Approximately 10-50 animals of each taxon were removed from a sample, washed, and placed on preweighed, circular, 5-mm diameter, aluminum boats. The boats were placed on numbered 26-mm diameter aluminum discs, dried at room temperature for 2 days in a desiccator, and reweighed. Ash-free weights were based on literature conversion values.

FISH LARVAE

Study Area

Seven larval fish sampling stations were established on the St. Marys River. Station 1 was located at the railroad bridge on the Sault Edison Hydropower Canal in Sault Ste. Marie (Table 2,

Fig. 4). We sampled on the east side of the bridge between the first and second support columns.

Station 2 was near buoy 86A off Six Mile Point on the east side of the river. Substrate was sand, gravel, and cobble.

Station 3 (buoy 53) was located in the west (downbound) channel where the channel splits around the northern tip of Neebish Island. The channel was 1.1 km from the mainland, and onshore cattail stands predominated. Substrate was mostly firm, though occasionally soft, and appeared to be organic material; no rocks were noted.

Station 4 (buoy 72) was located in the east channel upstream from Neebish Island. At this station the channel was about 1.3 km from Sugar Island. Substrate was mostly soft, and included organic material and sand. Cattails predominated along the shoreline.

Station 5 (buoy 62) was located off the southwestern tip of Sugar Island. It was the most unique, being very rocky with large boulders common alongshore. This station had an undulating contour with large boulders projecting from the water up to 100 m from shore.

Station 6 (buoy 33) was located in the upbound channel on the east side of Neebish Island. The bottom was sand, with the adjacent shoreline comprised of an extensive wooded swamp. Scattered organic debris (sticks, tree branches) was sometimes encountered.

Station 7 was at buoy 13. This station was at the southern tip of Neebish Island, east of Winter Point, near a dump site (rocks, dredge spoils) which forms a spit in the river and a bay behind the dump site. The shore was wooded and the bottom firm and sandy with some organic material. The entire shoreline appeared to be similar from Winter Point to the spit. At stations 2 through 7, channel sampling was conducted between the 9- and 11-m contours (in the shipping channel), while nearshore samples were taken at the 1- and 2-m depth contours, along the shore adjacent to the buoy marking the station.

Sampling Procedures

Bridge Samples--

At the railroad bridge we collected duplicate night samples with a 0.5-m diameter, 363-μm mesh net. The net was secured to the bridge with rope and sampled ≤ 1 m below the surface for 10 min. Surface water temperature and current velocity were

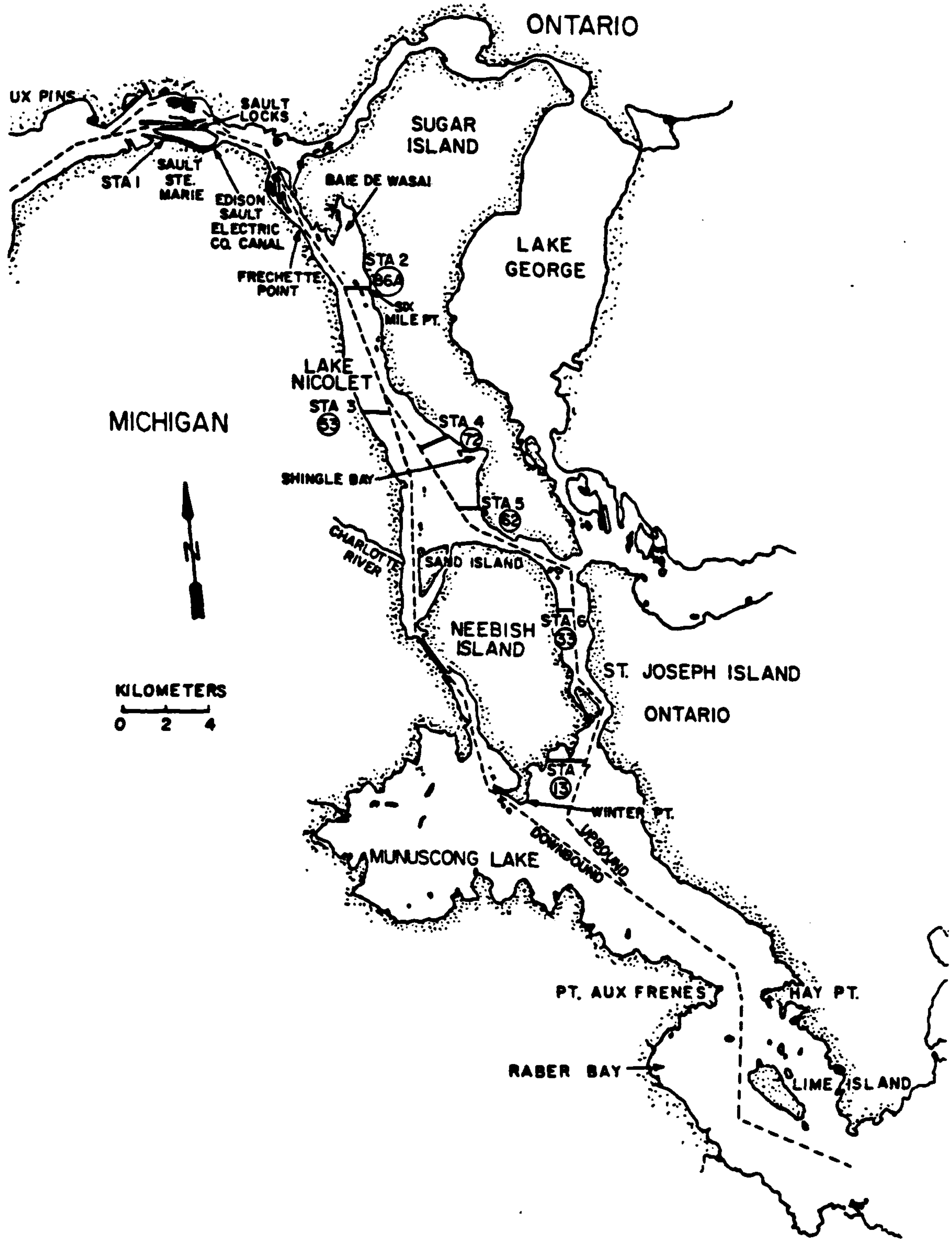


Figure 4. Location of stations (1 to 7) where fish larvae and eggs were sampled in the St. Marys River, 1985. Channel buoy numbers are in circles. STA = station.

Table 2. Descriptions of stations sampled for larval fish in the St. Marys River, Michigan, 1985.

Station no.	Location	Substrate type at shore stations	Brief description
1	Railroad Bridge	unknown, probably rock	off the Soo Line railroad bridge over the Sault Edison Hydropower Canal
2	Buoy 86A	rocky, cobble and larger rocks	near Six Mile Point, off Sugar Island shoreline
3	Buoy 53	organic material, cattails, firm bottom	where channel splits before Neebish Island, downbound (west) channel off mainland shore
4	Buoy 72	fairly soft bottom, sandy, some cattails	where channel splits above Neebish Island, upbound (east) channel, near Shingle Bay off Sugar Island shore
5	Buoy 62	very rocky, boulders common	southwestern tip of Sugar Island
6	Buoy 33	sandy firm bottom	east side of Neebish Island
7	Buoy 13	sandy firm bottom with some organic material	south end of Neebish Island

measured (Figs. 5 and 6). During the first week, samples were collected with a 1-m diameter net, but because of the difficulty in retrieving the net against the strong current, we switched to a 0.5-m diameter net for all remaining samples.

Shore Pull Net Samples--

A specially designed pull net (Fig. 7), equipped with handles and a 363-μm mesh net mounted on a rectangular frame (20 X 57.5 cm), was used at night for collection of shore samples at each station. The net was equipped with a flowmeter and was pulled by two people walking in about 1 m of water. The net usually was in mid-depth and the two people were about 4 m apart. They walked upstream as fast as possible for 66 paces or approximately 61 m. Duplicate, non-overlapping samples were collected. Water temperature was measured at each station for all samples.

Push Net Samples--

Push net samples (Fig. 8) were collected using a 0.5-m diameter, 363-μm mesh net rigidly mounted in front of a 4.9-m Boston Whaler; duplicate tows were performed at about 0.5 m below the surface of the water. We ran the boat engine (70-hp Evinrude) at 1000 RPM upriver for 5 min at the 2-m depth contour.

Channel Samples--

Channel samples were collected with a 1-m diameter, 363-μm-mesh net; duplicate, stepped oblique tows were performed (Fig. 9). We standardized the tows so that the net fished at four depths (surface, 3 m, 5 m, and 7 m) for 1 min each, with 15 s between each depth as the net was retrieved. The engine was run at 1500 RPM.

Sampling Schedule

Sampling was performed weekly (6 wk) from April 26 to May 30, 1985 (Table 3 shows sampling schedule). A total of 228 samples were collected, all at night.

Sample Processing

All fish larvae samples were preserved immediately in 10% formaldehyde solution. Samples were sorted using binocular microscopes. Larval fish identifications were based on taxonomic

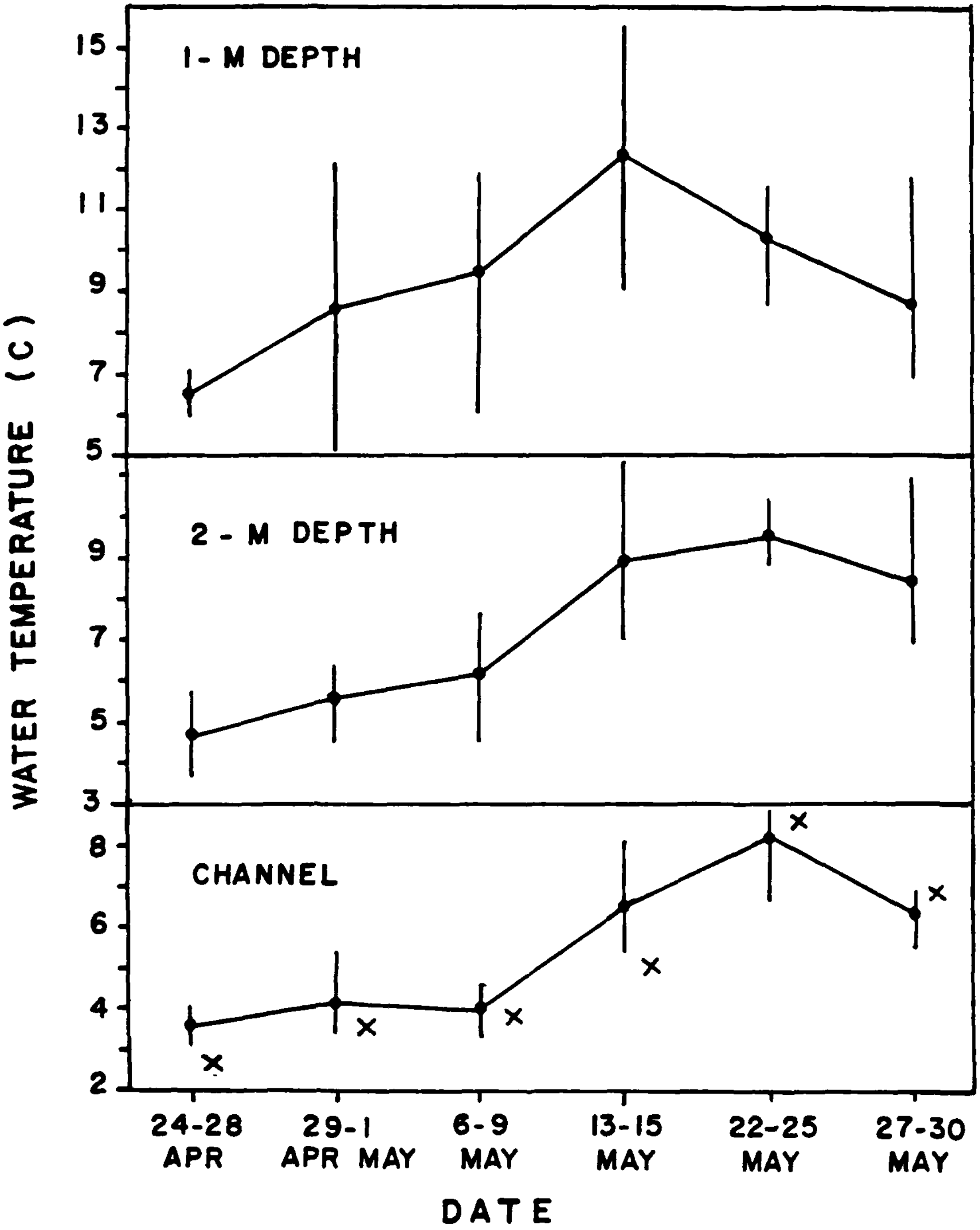


Figure 5. Mean and range (vertical lines) of bottom water temperatures measured at six stations in the St. Marys River, 1985. X's designate surface water temperature in the Edison Hydropower Canal - station 1.

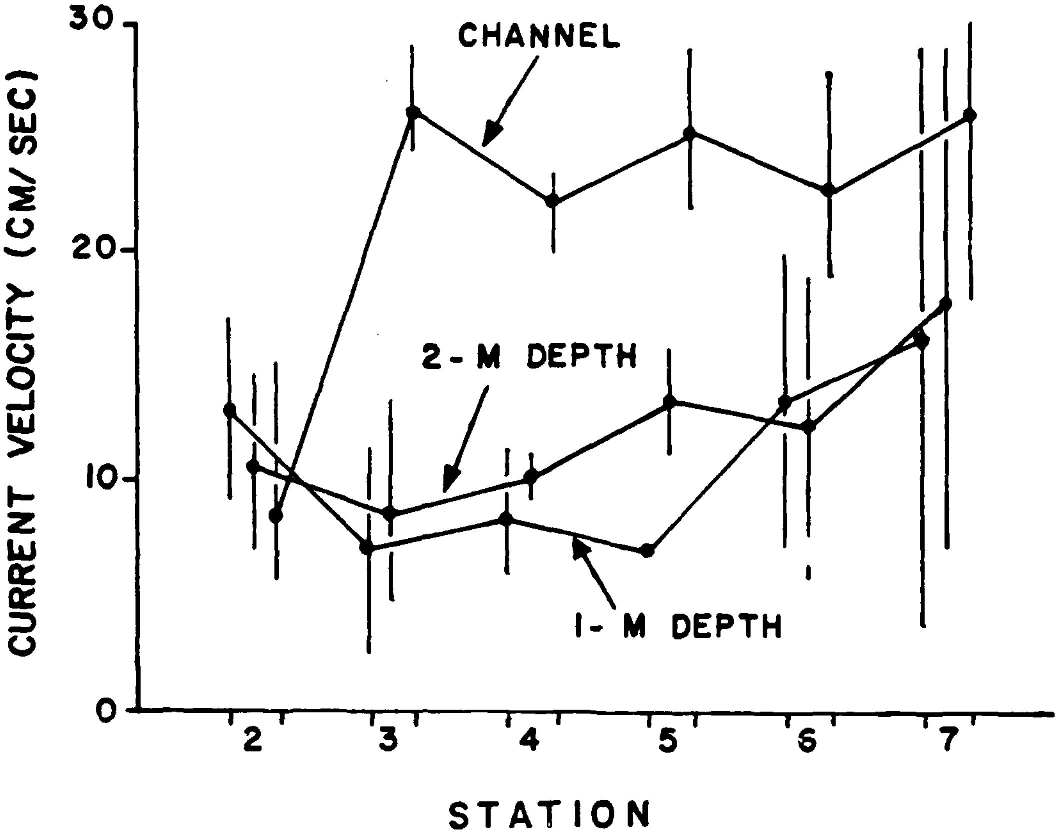


Figure 6. Current velocities measured at six stations in the St. Marys River, 1985. Points indicate means; vertical lines represent ranges; N varied from 2 to 5.

descriptions by Auer (1982) and Cucin and Faber (1985). All fish larvae were measured to the nearest 0.1 mm (lake whitefish and lake herring) or 0.5 mm total length (larvae of other species) and enumerated. Rainbow smelt eggs, recognized by the presence of a stalk, were also counted.

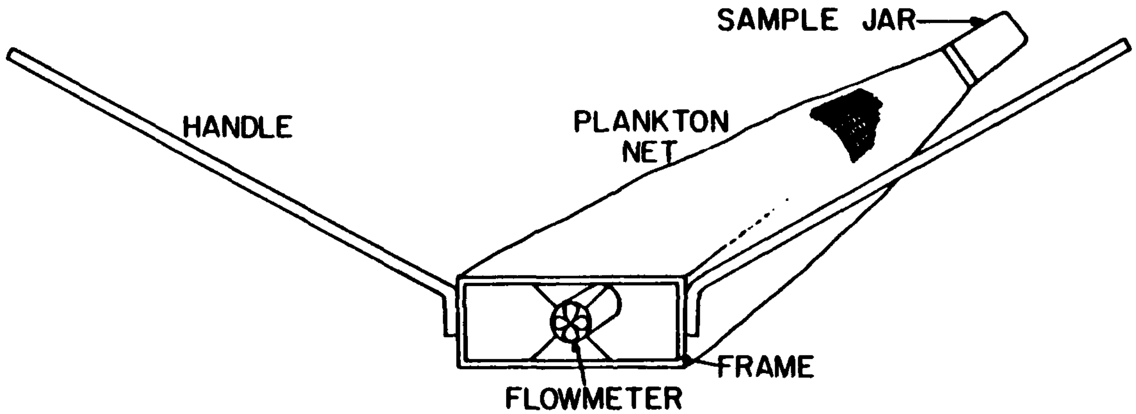


Figure 7. Pull net used for nearshore tows. Net is equipped with a 363-μm-mesh, 0.5-m diameter plankton net mounted on a rectangular frame (20 x 57.5 cm).

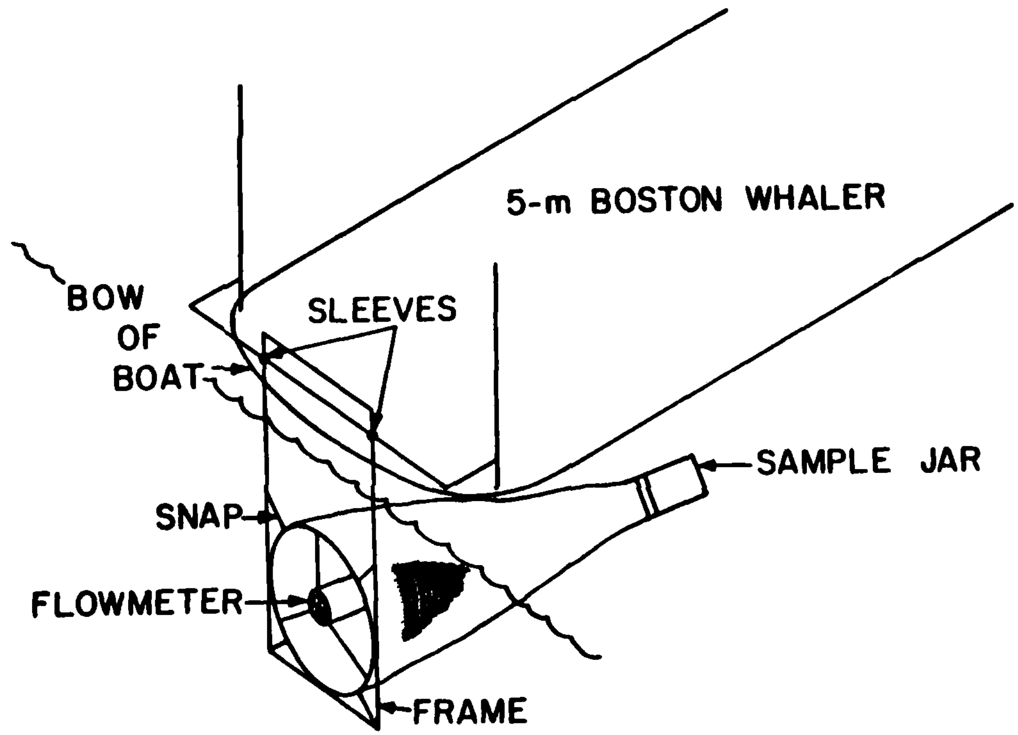


Figure 8. Push net equipped with a 363-μm-mesh, 0.5-m diameter plankton net. The net was attached to a rectangular frame on the bow of the boat. The sleeves allowed the frame to be raised and lowered into the water and the snaps were used to attach and detach the net from the frame.

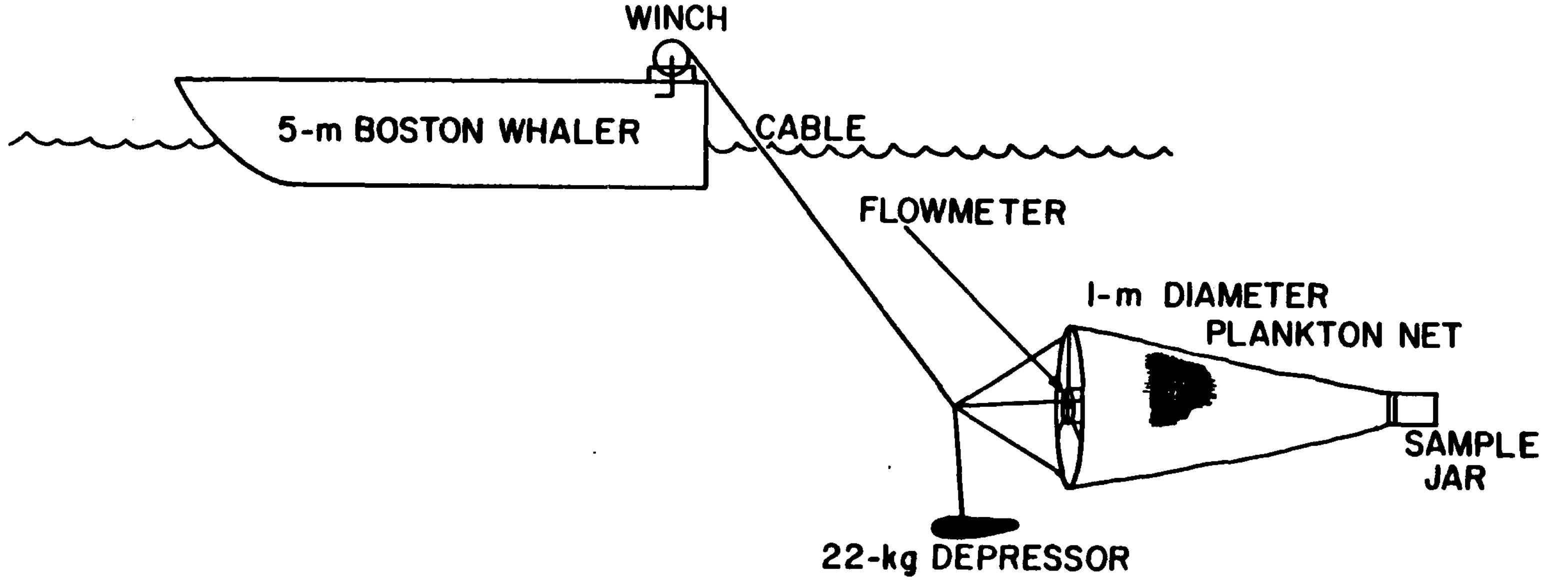


Figure 9. Boat and 1-m diameter, 363-μm-mesh net deployed in the channel.

Table 3. Dates when night larval fish sampling on the St. Marys River was conducted during 1985. a = shore (1 m), b = 2 m, c = channel.

Week No.	Stations Sampled	Dates
1	1	24 Apr
	2,3	26 Apr
	4-7	27-28 Apr
2	5-7	29-30 Apr
	2-4	30 Apr-1 May
	1	1 May
3	1	6 May
	5-7	7-8 May
	2-4	8-9 May
4	2-4	13-14 May
	5-7	14-15 May
	1	15 May
5	1	22 May
	5-7	23-24 May
	2-4	24-25 May
6	1	27 May
	2c,3,4	28-29 May
	2a,2b,5-7	29-30 May

RESULTS

MACROPHYTES

Introduction

Studies were undertaken to describe the relationship between the degree of light penetration through the water column and maximum depth of occurrence of macrophytes. This was partly aimed at confirming the findings of Liston et al. (1985), who showed that in the clear waters of the upper reaches of the St. Marys River plants grow at greater depths than in the more turbid waters of the downstream portions.

Results

The frequencies of plants occurring in the grab-samples taken along the 1-km transects at the five sampling sites (Table 4) showed that members of the Characeae, a family of green algae, were the most abundant plants at all transects. In most samples the Charophytes retrieved did not have reproductive structures, which are necessary for proper identification. Therefore, they are listed at *Nitella* sp. indeterminable or *Chara* sp. indeterminable. Most of the specimens of *Nitella* probably belonged either to the species *Nitella flexilis* or *N. opaca*. Only one species of *Chara* was identified, *Chara fragilis*, but one or two other species were probably also in the samples. In nearly all samples *Nitella* was present in much greater quantities than *Chara*.

Vascular plants were important at two sites, Izaak Walton Bay and Raber Bay. These were also the only two sites where all grab-samples contained plants. In the case of Raber Bay this is because samples were taken at depths probably 0.3-0.6 m shallower than the actual macrophyte bed boundary. This was the first site sampled and our subsequent experience showed that vascular macrophytes tend not to grow at depths as great as do the Charophytes. Izaak Walton Bay is relatively shallow throughout (≤5 m) and no place was found where plants did not grow on the bottom; the grab-sample transect was located in the central, deepest portion of the bay. Therefore, the data for Izaak Walton Bay are not from a true macrophyte boundary.

Fifteen sets of light readings were taken at each of the five river localities. Each set of readings was used to calculate a vertical light extinction coefficient and all 15 were used to calculate a mean extinction coefficient for each site. A

Table 4. Plant frequency along 1-km transects over the outer depth boundary of submerged macrophyte beds in five locations in the St. Marys River, August 1985. Frequencies are given in terms of the percentage of grab-samples in which the plant occurs.

Plants	Izaak Walton Bay	Lake Nicolet	West Lake Munuscong	East Lake Munuscong	Raber Bay
Nitella sp. indeterm.	33.3	86.7	70.0	53.1	77.4
Nitella flexilis	56.7		6.7	9.4	25.8
Chara sp. indeterminable	50.0	6.7	36.7	18.8	71.0
Chara globularis	20.0				3.2
Potamogeton sp. indeterm.	6.7				
Potamogeton praelongus	13.3				3.2
Potamogeton gramineus	23.3				3.2
Potamogeton richardsonii					3.2
Elodea canadensis	3.3	6.7			
Vallisneria americana					6.5
Isoëtes macrospora	10.0				
No plants in sample	0	13.3	13.3	34.4	0
Sampling depth (m)	4.5	8.2	5.2	4.9	4.0
Number of samples	30	30	30	32	31

95% confidence interval for the mean extinction coefficient was derived using Student's t-statistic (Mendenhall 1971). The mean extinction coefficients, with their confidence intervals, are plotted against the depth of the macrophyte boundary (Fig. 10). Also plotted are two regression lines; the data from Izaak Walton Bay were omitted from the regression calculations because they do not correspond to the true maximum depth of macrophyte occurrence. The extinction coefficients from the 15 sets of

light readings from each of the four other sites were used in calculating line A, and line B was fitted to the mean extinction coefficients from the four sites. Line B shows a much stronger relationship between macrophyte boundary depth and light extinction coefficient ($r=-0.976$) than line A ($r=-0.655$). All correlation coefficients cited are significantly different from zero, $p<0.02$. This is due to the great variability in the light extinction measurements, particularly those from the three downstream stations.

In their investigations, Liston et al. (1985) found macrophytes growing on the bottom of the navigation channel north of Izaak Walton Bay, at depths greater than 10 m. If we assume that the depth of the macrophyte boundary would lie at 10.5 m in the bay, and use the light extinction coefficient data from that site and the remaining four in regression calculations, we obtain the results shown in Figure 11. Curve C, obtained by polynomial regression of all 75 extinction coefficient measurements from the five sites, shows a moderately strong relationship between depth and extinction coefficients ($r=-0.897$). An even stronger correlation ($r=-0.968$) is shown by line D, which is derived by linear regression of the five mean light extinction coefficients.

DRIFT: BENTHOS, FISH LARVAE, FISH EGGS, AND MACROPHYTES

Introduction

Benthic drift collected by coarse- (355 μm) and fine- (153 μm) mesh nets during winter (ice-cover conditions) and summer (ice-free conditions) in the St. Marys River was represented by 71 benthic, 5 larval fish, and 12 macrophyte taxa (Table 5). Due to study design, all stations at each transect were sampled by coarse-mesh nets only; therefore, results presented here will consider only those estimates derived from coarse-mesh nets unless otherwise stated.

Mesh Size Comparisons

In nearly all comparisons, total benthic and larval fish drift densities estimated by fine-mesh nets exceeded that of concurrently set coarse-mesh nets. Only in about half of these comparisons was the difference statistically significant, with total benthic and larval fish densities in fine-mesh nets always exceeding coarse-mesh net densities. At Frechette Point, net comparisons for stations 3-5 indicated the difference in total benthic drift density was significant only at station 5 in the winter and only at station 4 during the summer. When averaged over all stations, there was no significant difference in total benthic drift density between mesh sizes during winter. However,

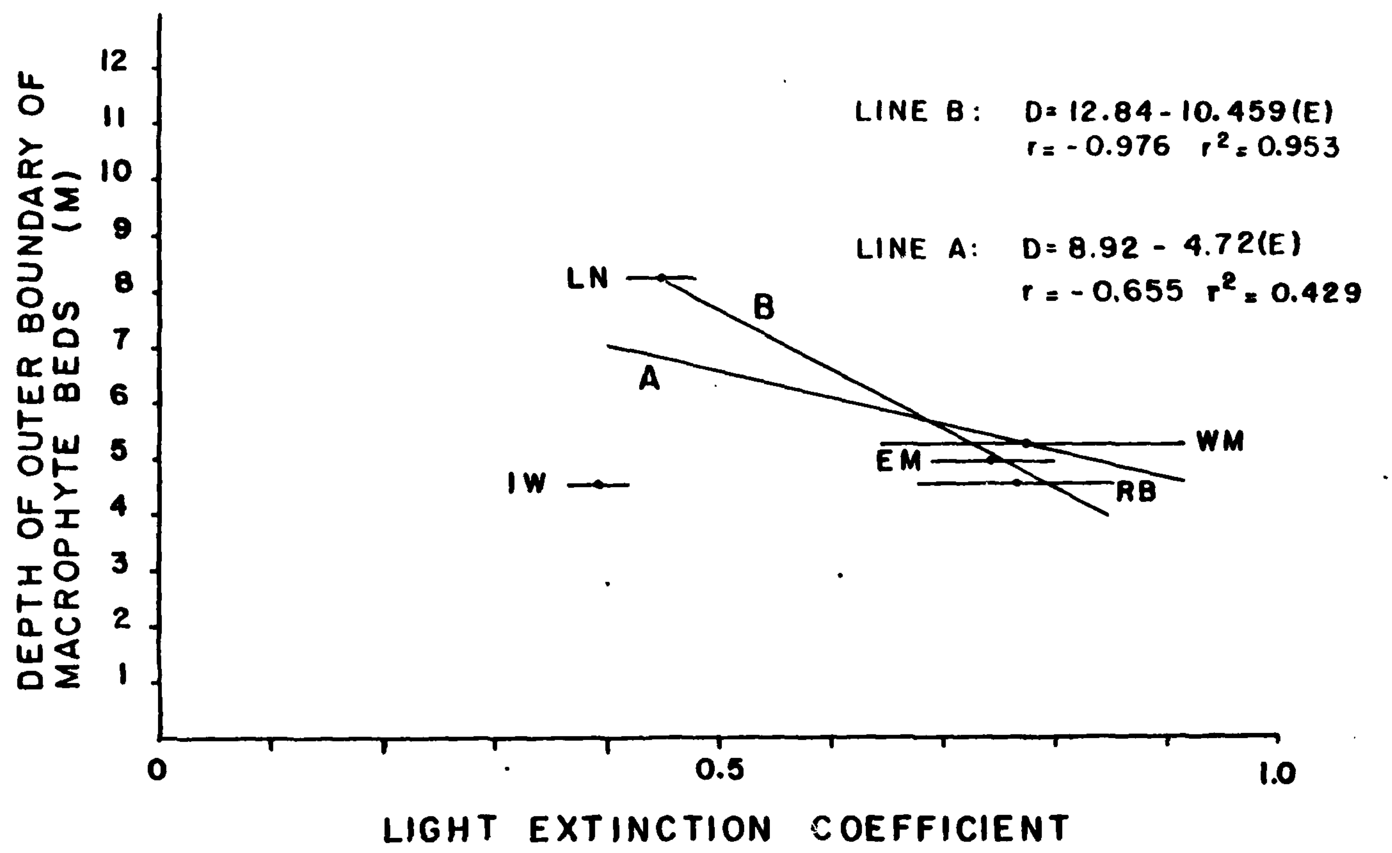


Figure 10. Plot of mean light extinction coefficient versus maximum depth of macrophyte occurrence at five sites in the St. Marys River. IW = Izaak Walton Bay, LN = Lake Nicolet, EM = east Lake Munuscong, WM = west Lake Munuscong, RB = Raber Bay. The center point of each horizontal bar indicates the mean value of the light extinction coefficient and the length of the bar is its 95% confidence interval. Line A is derived by linear regression of 60 light extinction coefficient measurements from all sites excluding Izaak Walton Bay; line B is from regression using the mean light extinction coefficients from the four sites. The equations for lines A and B and their correlation coefficients are also given (D = depth of outer boundary of macrophyte beds, E = light extinction coefficient).

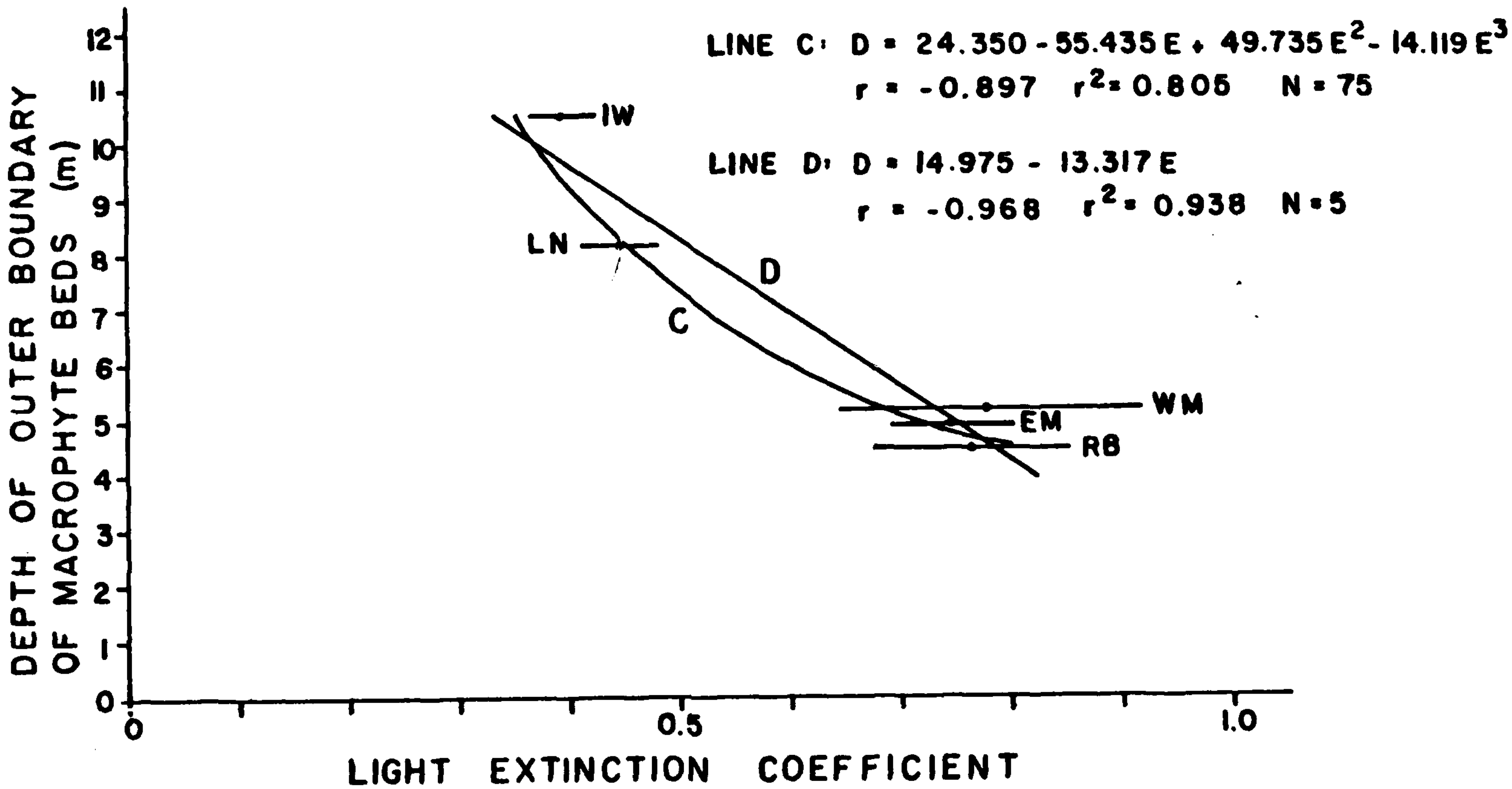


Figure 11. Plot of the same data as in Figure 7, with the exception that a macrophyte boundary depth of 10.5 m is assumed for Izaak Walton Bay. Curve C is a polynomial regression line derived using the 75 light extinction coefficients from the five sites. Line B is derived by linear regression of the mean light extinction coefficients from the five sites. Also given are the polynomial and linear regression equations. D=depth of outer boundary of macrophyte beds, E=light extinction coefficient.

Table 5. Comprehensive list of macrophytes, benthic invertebrates, and fish larvae collected in 355- and 153-um-mesh drift net samples during winter and summer and in 153-um-mesh nets during the upbound and downbound ship passage study in the St. Marys River, 1985.

Taxon	355-um net	153-um net	Upbound study	Downbound study
MACROPHYTES				
Bryum pseudotriquitrum	x	-	-	-
Carex sp.	x	-	-	-
Chara sp. (alga)	x	x	-	-
Equiseta	x	x	-	-
Elodea sp.	x	x	x	x
Isoetes sp.	x	-	-	-
Juncus sp. or *Scirpus* sp.	-	x	-	-
Lemna sp.	x	x	-	-
Nitella sp.	x	x	x	-
Potomageton sp.	x	x	x	x
Typha sp.	x	-	-	-
Utricularia sp.	x	-	-	-
BENTHOS				
Coelenterata				
Hydra sp.	x	x	x	x
Turbellaria	x	x	x	x
Oligochaeta				
Naididae	x	x	x	x
Tubificidae	x	x	x	-
Enchytraeidae	x	x	x	x
Lumbriculidae				
Stylodrilus heringianus	x	x	-	-
Polychaeta				

Table 5. Continued.

Taxon	355-um net	153-um net	Upbound study	Downbound study
Manayunkia speciosa	x	x	x	x
Hirudinea	x	–	–	–
Mysidacea				
Mysis relicta	x	x	–	–
Isopoda				
Asellus	x	x	–	–
Lirceus	x	–	–	–
Amphipoda				
Pontoporeia hoyi	–	x	–	–
Gammarus sp. (*pseudolimnaeus* ?)	x	x	–	–
Hyalella azteca	x	x	–	–
Crangonyx sp.	x	–	–	–
Acari				
Hydracarina	x	x	x	–
Oribatei	–	–	x	–
Insecta				
Collembola	x	x	x	–
Plectoptera				
Alloperla sp.	x	–	–	–
early instar Plecoptera	–	x	–	–
Ephemeroptera				
Baetis	x	–	–	–
Callibaetis	x	–	–	–
early instar Baetidae	x	x	–	–
Heptagenia	x	–	–	–
Stenacron	x	x	–	–
Stenonema	x	x	–	–
prob. *Stenonema*	x	–	–	–
early instar Heptageniidae	x	x	–	–
Leptophlebia	x	–	–	–
early instar Leptophlebidae	x	x	–	–
Eurylophella	x	x	–	–

Table 5. Continued.

Taxon	355-um net	153-um net	Upbound study	Downbound study
Caenis sp.	x	x	-	x
Baetisca sp.	x	-	-	-
Ephemera sp.	x	x	x	-
Hexagenia sp.	x	x	-	x
early instar Ephemeridae	x	-	-	-
Ephoron sp.	x	-	-	-
early instar Ephemeroptera	x	x	x	x
Odonata				
Lestes sp.	x	-	-	-
Corixidae	x	x	-	-
Trichoptera				
Cyrnellus sp.	x	-	-	-
Neureclipsis sp.	x	x	-	-
Nyctiophylax sp.	x	-	-	-
Polycentropus sp.	x	x	x	x
Polyplectron sp.	x	x	-	-
early instar Polycentropodidae	x	-	-	-
Cheumatopsyche sp.	x	-	-	-
Hydropsyche sp.	x	x	-	-
Symphitopsyche sp.	x	-	-	-
Hydroptila sp.	x	x	-	-
Oxythira sp.	x	-	-	-
Ceraclea sp.	x	-	-	-
Mystacides sp.	x	-	-	-
Triaenodes sp.	x	x	-	-
Oecetis sp.	x	x	-	-
early instar Trichoptera	x	x	-	-
Lepidoptera	x	x	-	-
Diptera				
Psycodidae	x	x	-	-
Chaoboridae	x	x	-	-
Simuliidae	x	-	-	-

Table 5. Continued.

Taxon	355-um net	153-um net	Upbound study	Downbound study
Ceratopogonidae	x	x	-	-
Chironomidae	x	x	x	x
Empididae	x	x	-	x
Muscidae	-	x	-	-
Gastropoda				
Valvata sincera	x	-	-	-
Valvata tricarinata	x	-	-	-
Valvata sp.	x	-	-	-
Amnicola limosa	x	-	-	-
Gyraulus parvus	x	-	-	-
Helisoma trivolvis	x	-	-	-
Pelecypoda				
Pisidium spp.	x	x	-	-
FISH LARVAE				
Coregonus artedii (Lake herring)	x	-	-	-
Lota lota (Burbot)	x	x	x	x
Myoxocephalus thompsoni (Deepwater sculpin)	x	-	-	-
Osmerus mordax (Rainbow smelt)	x	x	x	x
Perca flavescens (Yellow perch)	x	-	-	-

during summer, total benthic drift density averaged over all stations was significantly greater in fine- (1562/1000 m^3) than coarse- (1153/1000 m^3) mesh nets (Tables 6 and 7).

At stations 3 and 4, summer fish larval drift density was significantly greater in fine-mesh nets (129/1000 m^3 and 233/1000 m^3, respectively) when compared with coarse-mesh nets (59/1000 m^3 and 77/1000 m^3, respectively). There were no mesh-size-related density differences at station 5. When averaged over all samples at stations 3-5, fine-mesh nets retained significantly greater numbers of fish larvae than did coarse-mesh nets (183/1000 m^3 vs. 87/1000 m^3).

At Lake Nicolet, fine-mesh net estimates of total benthic drift density were significantly greater only at stations 6 and 7 during the winter; whereas, in summer this was the case only at station 4. However, when averaged over all stations, fine-net estimates of total benthic drift density exceeded those of coarse nets during both winter (102/1000 m^3 vs. 18/1000 m^3) and summer (1383/1000 m^3 vs. 670/1000 m^3) (Tables 6 and 7).

Mesh-size-related differences in drifting fish larvae densities were significant only at navigation channel stations 4 and 6 in Lake Nicolet. At station 4, the number of fish larvae retained by fine-mesh nets (1972/1000 m^3) was significantly greater than that retained by coarse-mesh nets (661/1000 m^3). Similarly, in the upbound channel, the fine-mesh nets (778/1000 m^3) had a significantly greater number of fish larvae than did coarse-mesh nets (323/1000 m^3). When averaged over all samples at stations 3, 4, 6, and 7 having concurrently set fine- and coarse-mesh nets, larval fish drift density was significantly greater in fine-mesh nets (1095/1000 m^3) when compared with coarse-mesh nets (501/1000 m^3).

At Point aux Frenes, the difference between total benthic drift density catches based on mesh size was significant at all stations except station 3 during both seasons. When averaged over all stations, estimates of total benthic drift density were significantly greater in fine when compared with coarse-mesh nets during both winter (150/1000 m^3 vs. 25/1000 m^3) and summer (764/1000 m^3 vs. 183/1000 m^3) (Tables 6 and 7).

Ratios of fine to coarse-mesh net densities suggested a variety of relative catch efficiencies dependent upon taxon, season, and transect (Tables 6 and 7). However, when comparisons of log densities for each major component of the drifting benthos were made for densities averaged over all coarse and fine-mesh nets, respectively, significant density differences were noted only for Naididae, Chironomidae, total benthos without *Hydra*, total benthos, and *Mysis relicta*. In all but the latter comparison, i.e., for *M. relicta*, densities in fine-mesh nets

Table 6. Winter comparisons of benthic drift catches in 355-um and 153-um nets at stations where both nets were set concurrently. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total benthos (%T) based on pooling of catches over all depths in the Day 1/Night 1 periods at each station for major benthic drift components in the St. Marys River, 1985. In the last column where density was averaged over all observations for each net size at each transect, the ratio is the fine divided by the coarse-mesh net density. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Frechette Pt. - Winter												
	Stn. 3				Stn. 4				Stn. 5				
	355 um		153 um		355 um		153 um		355 um		153 um		
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
Hydra	168	21.7	157	22.3	52	7.1	71	12.3	44	91.2	18	14.2	0.98
Naididae	57	7.4	54	7.7	7	0.9	4	0.7	0	0	9	6.8	1.05
Mysis relicta	2	0.3	1	0.1	2	0.3	0	0	0	0	0	0	0.14
Amphipoda	1	0.1	1	0.2	0	0	1	0.1	0	0	0	0	3.64
Hydracarina	8	1.0	0	0	0	0	2	0.3	0	0	40	31.5	6.00
Ephemeroptera	1	0.2	2	0.3	1	0.1	0	0	0	0	0	0	0.84
Corixidae	0	0	0	0	0	0	0	0	0	0	0	0	-
Trichoptera	1	0.1	0	0	1	0.2	1	0.1	0	0	0	0	0.46
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	-
Chironomidae	519	66.9	458	65.3	661	90.7	493	84.6	4	8.8	57	44.5	0.83
Total benthos w/o _Hydra_	608	78.3	545	77.7	677	92.9	511	87.7	4	8.8	110	85.8	0.87
Total benthos	776	-	702	-	729	-	582	-	48	-	128	-	0.89
No. of taxa		16		14		13		11		2		5	-
N		8		8		12		12		8		8	-

Table 6. Continued.

	Lake Nicolet - Winter																
	Stn. 3				Stn. 4				Stn. 6				Stn. 7				
	355 um		153 um		355 um		153 um		355 um		153 um		355 um		153 um		
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
<u>Hydra</u>	1	3.1	1	2.5	5	22.2	3	5.7	0	0	0	0	0	0	0	0	0.60
Naididae	0	0	0	0	<1	2.1	<1	0.8	0	0	0	0	0	0	0	0	0.95
<u>Mysis relicta</u>	19	53.6	13	29.1	6	27.0	6	11.3	2	27.9	0	0	3	28.7	1	0.6	0.70
Amphipoda	0	0	0	0	1	3.7	2	3.2	0	0	1	1.0	0	0	0	0	3.01
Hydracarina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Ephemeroptera	0	0	0	0	1	3.7	0	0	2	41.9	0	0	0	0	0	0	-
Corixidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Chironomidae	14	39.8	30	68.4	10	41.3	44	78.2	2	30.2	78	97.8	7	71.3	261	99.4	12.2
Total benthos w/o <u>Hydra</u>	34	96.9	43	97.5	18	77.8	53	94.3	6	100	80	100	10	100	262	100	6.22
Total benthos	36	-	44	-	24	-	57	-	6	-	80	-	10	-	262	-	5.67
No. of taxa		4		3		7		7		4		3		2		2	-
N		8		8		12		12		12		12		8		8	-

Table 6. Continued.

Taxon	Point aux Frenes - Winter												
	Stn. 3				Stn. 4				Stn. 5				
	355 um		153 um		355 um		153 um		355 um		153 um		
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
Hydra	0	0	0	0	0	0	0	0	-	-	-	-	-
Naididae	0	0	0	0	0	0	0	0	-	-	-	-	-
Mysis relicta	2	5.2	1	0.5	<1	2.9	0	0	-	-	-	-	0.41
Amphipoda	3	6.0	3	1.1	0	0	0	0	-	-	-	-	0.94
Hydracarina	1	2.6	1	0.5	1	4.4	0	0	-	-	-	-	0.60
Ephemeroptera	2	5.2	0	0	0	0	0	0	-	-	-	-	-
Corixidae	2	3.4	1	0.5	0	0	0	0	-	-	-	-	0.75
Trichoptera	0	0	0	0	0	0	0	0	-	-	-	-	-
Chaoboridae	0	0	0	0	0	0	0	0	-	-	-	-	-
Chironomidae	35	77.8	218	96.8	10	88.3	100	100	-	-	-	-	7.24
Total benthos w/o *Hydra*	45	100	225	100	12	100	100	100	-	-	-	-	5.95
Total benthos	45	-	225	-	12	-	100	-	-	-	-	-	5.95
No. of taxa		7		6		4		1		-		-	-
N		8		8		12		12		-		-	-

Table 7. Comparisons of summer benthic and ichthyoplankton drift catches in 355-um and 153-um nets for stations where both nets were set concurrently (i.e., Day 1 and Night 1). Mean density ($\bar{X}$, no./1000 m³) and percentage of total density (%T) for benthos, fish larvae, and fish eggs based on pooling catches for each over all depths in the Day 1/Night 1 periods at each station in the St. Marys River, 1985. In the last column where density was averaged over all observations for each net size at each transect, the ratio is the fine- divided by the coarse-net density. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Frechette Pt. - Summer												
	Stn. 3				Stn. 4				Stn. 5				
	355 um		153 um		355 um		153 um		355 um		153 um		
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
Hydra	752	50.5	386	24.1	496	63.2	796	50.3	841	61.6	504	33.7	0.90
Naididae	256	17.2	315	196	46	5.9	94	5.9	91	6.6	164	11.0	1.45
Mysis relicta	8	0.5	2	0.1	12	1.6	3	0.2	0	0	0	0	0.26
Amphipoda	0	0	0	0	0	0	0	0	28	2.1	5	0.3	0.17
Hydracarina	4	0.3	3	0.2	2	0.3	0	0	5	0.3	4	0.2	0.52
Ephemeroptera	26	1.7	9	0.5	14	1.8	6	0.4	18	1.3	19	1.3	0.56
Corixidae	0	0	0	0	2	0.2	0	0	0	0	0	0	-
Trichoptera	84	5.7	73	4.5	49	6.3	19	1.2	25	1.8	22	1.5	0.64
Chaoboridae	113	7.6	26	1.6	2	.02	0	0	0	0	0	0	0.20
Chironomidae	224	15.0	782	48.8	155	19.7	656	41.4	239	17.5	705	47.2	3.53
Total benthos w/o *Hydra*	737	49.5	1215	75.9	289	36.8	788	49.7	525	38.4	990	66.3	1.95
Total benthos	1489	-	1601	-	785	-	1584	-	1367	-	1494	-	1.35
No. of taxa		22		13		21		16		18		15	-
Rainbow smelt	50	84.6	123	95.6	64	83.6	207	88.9	104	80.3	111	72.1	2.20
Yellow perch	0	0	0	0	1	0.9	0	0	0	0	0	0	-
Burbot	1	2.3	0	0	5	6.0	5	2.1	6	5.0	6	4.2	0.98
Deepwater sculpin	0	0	0	0	3	3.3	0	0	0	0	0	0	-
Damaged larvae	8	13.1	6	4.4	5	6.2	21	9.0	19	14.8	37	23.7	2.23
Total fish larvae	59	-	129	-	77	-	233	-	129	-	154	-	2.11
Rainbow smelt	0	0	0	0	8	75.9	4	100	11	76.6	4	100	0.41
Unknown	0	0	0	0	3	24.1	0	0	3	23.4	0	0	-
Total fish eggs	0	-	0	-	11	-	4	-	14	-	4	-	0.31
N		8		7		12		12		8		8	-

Table 7. Continued.

	Lake Nicolet - Summer																
	Stn. 3				Stn. 4				Stn. 6				Stn. 7				
	355 um		153 um		355 um		153 um		355 um		153 um		355 um		153 um		
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
Hydra	13	1.7	43	4.1	72	10.2	85	5.3	54	11.7	96	7.9	0	0	2	0.1	1.58
Naididae	0	0	16	1.5	5	0.8	15	0.9	11	2.4	29	2.4	0	0	4	0.2	3.57
Mysis relicta	9	1.1	0	0	2	0.3	14	0.9	28	6.1	2	0.2	6	0.7	0	0	0.42
Amphipoda	24	3.0	7	0.7	18	2.5	13	0.8	32	7.2	7	0.6	0	0	13	0.8	0.50
Hydracarina	21	2.8	2	0.2	4	0.6	4	0.5	0	0	0	0	0	0	0	0	0.31
Ephemeroptera	194	24.9	102	9.8	118	16.8	202	12.6	34	7.7	67	5.5	265	31.3	91	5.6	0.87
Corixidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Trichoptera	94	12.1	30	2.9	98	14.0	30	1.9	22	4.9	25	2.1	123	14.6	67	4.1	0.46
Chaoboridae	0	0	0	0	0	0	2	0.2	0	0	0	0	0	0	0	0	-
Chironomidae	423	54.4	838	80.7	374	53.2	1215	75.6	265	59.0	945	77.2	452	53.4	1439	88.4	3.01
Total benthos w/o *Hydra*	764	98.3	995	95.9	631	89.8	1523	94.7	395	88.1	1128	92.1	847	100	1626	99.9	2.09
Total benthos	778	-	1038	-	702	-	1608	-	449	-	1225	-	847	-	1629	-	2.06
No. of taxa		10		10		18		17		13		14		8		12	-
Rainbow smelt	455	74.8	732	87.6	510	77.1	1747	88.5	235	72.9	561	72.1	200	47.5	299	58.2	2.54
Burbot	15	2.5	14	1.6	9	1.4	13	0.7	0	0	0	0	0	0	0	0	1.14
Damaged larvae	138	22.7	90	10.7	142	21.5	213	10.8	88	27.1	217	27.9	220	52.5	215	41.8	1.35
Total fish larvae	608	-	836	-	661	-	1972	-	323	-	778	-	420	-	513	-	2.19
N		8		8		12		12		12		12		8		8	-

Table 7. Continued.

	Point aux Frenes - Summer												
	Stn. 3				Stn. 4				Stn. 5				
	355 um		153 um		355 um		153 um		355 um		153 um		
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	Ratio
Hydra	0	0	0	0	0	0	0	0	0	0	0	0	-
Naididae	0	0	11	0.9	0	0	7	1.2	31	18.0	57	9.6	2.50
Mysis relicta	0	0	0	0	0	0	3	0.5	0	0	0	0	-
Amphipoda	43	11.1	60	5.1	10	19.0	26	4.4	13	7.2	13	2.2	1.60
Hydracarina	163	41.8	256	21.7	13	26.4	24	4.0	24	13.8	6	1.0	1.44
Ephemeroptera	40	10.3	49	4.2	0	0	3	0.5	58	33.2	45	7.6	1.01
Corixidae	5	1.2	3	0.3	3	6.3	0	0	4	2.6	0	0	0.23
Trichoptera	47	11.9	40	3.4	3	5.7	6	1.0	0	0	6	1.0	1.07
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	-
Chironomidae	88	22.5	732	61.9	21	42.4	532	88.6	33	18.8	437	73.9	12.9
Total benthos w/o *Hydra*	390	100	1182	100	50	100	600	100	174	100	591	100	4.19
Total benthos	390	-	1182	-	50	-	600	-	174	-	591	-	4.19
No. of taxa		9		12		5		7		8		12	-
Rainbow smelt	0	0	17	100	19	48.6	100	97.4	0	0	4	100	5.97
Damaged larvae	5	100	0	0	20	51.4	3	2.6	0	0	0	0	0.11
Total fish larvae	5	-	17	-	39	-	103	-	0	-	4	-	2.75
N		8		8		12		12		8		8	-

significantly exceeded those in coarse-mesh nets by a ratio ranging from 1.52 to 2.80. For *M. relicta*, the coarse-net density estimate (5.5/1000 m^3) was greater than that of the fine-mesh net (2.7/1000 m^3) by a ratio of 2.06.

At Point aux Frenes, there were no significant larval fish drift density differences among mesh sizes at stations 3, 4, and 5 or at stations 3-5 combined. However, in all comparisons, densities in fine-mesh nets exceeded those in coarse-mesh nets.

At stations and times where nets of both sizes were set concurrently, 59 benthic taxa were collected. While the number of taxa retained by coarse nets (50 taxa) was greater than that of fine nets (40 taxa), this trend was not generally evident. Within each station pooled over all depths at each transect and during each season, the most differences in the number of taxa retained by each mesh size was equal to or less than three taxa. Among those comparisons where the differentials were at least three, the number of taxa in fine-mesh nets exceeded those in coarse-mesh nets. Only at Frechette Point during summer were there any substantive differences in the number of taxa retained by the two mesh sizes. At Frechette Point, coarse-mesh nets consistently collected three to nine more taxa than did fine-mesh nets.

When comparing percent occurrence of macrophytes for the fine- and coarse-mesh nets over all transects and stations, percent occurrence in fine-mesh nets was greater in winter (61%) and summer (64%) than in coarse-mesh nets (39% and 48%, respectively). However, there was no difference in dominant plant taxa for coarse- and fine-mesh nets between seasons or for winter and summer seasons between mesh sizes. In all cases except fine-mesh nets in summer, the dominant macrophytes were *Nitella*, *Potomageton*, and *Elodea* in order of decreasing percent occurrence. Among fine-mesh nets in the summer, the order of the last two taxa was reversed.

Seasonal and Transect Comparisons of Drift Densities

General--

Using 355-μm-mesh nets, the benthic drift was comprised of 67 taxa which averaged 562/1000 m^3 when pooled over all samples collected (Table 8). The dominant forms were Chironomidae (183/1000 m^3), *Hydra* (170/1000 m^3), and Ephemeroptera (73/1000 m^3). Seasonally, both the number of taxa and average benthic drift estimates were lower in the winter (37 taxa and 195/1000 m^3) than during the summer (59 taxa and 871/1000 m^3) period. Although no fish larvae or eggs were caught during the winter, five larval fish species were collected during the summer. Average total

larval fish drift was 383/1000 m^3. The number of fish eggs retained by coarse-mesh nets in the summer averaged 2/1000 m^3 (Table 8).

Benthos--

Average winter total benthic drift density was significantly greater at Frechette Point when compared with those at Lake Nicolet or Point aux Frenes, which were not significantly different. Benthic drift data pooled over all winter samples at Frechette Point averaged 482/1000 m^3, while at Lake Nicolet and Point aux Frenes similar averages were 49/1000 m^3 and 21/1000 m^3, respectively (Table 9). Additionally, a greater number of taxa was collected at Frechette Point (36 taxa using both mesh sizes; 355 μm = 34, 153 μm = 17) than at Lake Nicolet (14 taxa using both mesh sizes; 355 μm = 12, 153 μm = 8) or Point aux Frenes (10 taxa using both mesh sizes; 355 μm = 9, 153 μm = 6). Although Chironomidae was the dominant taxon at all transects. At Frechette Point Chironomidae made up 81% of average benthic drift density, at Lake Nicolet it was 52%, and at Point aux Frenes it was 82%. Remaining components of the drift community structure varied at each transect. At Frechette Point, *Hydra* was the second-most dominant taxon making up 12% of benthic drift followed by Naididae (4%). At Lake Nicolet, Ephemeroptera (largely *Leptophlebia*) was the second-most dominant (24%) followed by *Mysis relicta* (17%, 8/1000 m^3). At Point aux Frenes, Corixidae (6%), Amphipoda (5%, largely *Hyalella azteca*), and *Mysis relicta* (3%) were the only remaining taxa, other than Chironomidae, making up a significant portion of benthic drift.

As during winter, average summer total benthic drift density at Frechette Point (1614/1000 m^3) was significantly greater than that at Lake Nicolet (597/1000 m^3) or Point aux Frenes (502/1000 m^3) (Table 9), which were not significantly different. The total number of taxa collected decreased from 55 taxa at Frechette Point to 35 taxa at Lake Nicolet and 22 taxa at Point aux Frenes. Chironomidae had the highest density of taxa at Lake Nicolet where it averaged 252/1000 m^3 (42% of benthic drift). Ephemeroptera at Lake Nicolet averaged 222/1000 m^3 [largely *Hexagenia* (155/1000 m^3) and *Caenis* (53/1000 m^3)] and made up 37% of summer benthic drift. At Frechette Point, Chironomidae drift density decreased relative to that of winter to 258/1000 m^3 (16% of benthic drift). While drift densities for practically all taxa increased from winter to summer at Frechette Point as at all transects, most notable increases at Frechette Point were for *Hydra* (975/1000 m^3, 60% of benthic drift), Naididae (174/1000 m^3, 11%), Trichoptera [66/1000 m^3, 4%; largely *Oecetis* (51/1000 m^3)], Chaoboridae (57/1000 m^3, 3.5%), and Ephemeroptera [35/1000 m^3, 2.2%; largely *Caenis* (16/1000 m^3)].

Table 8. Mean density ($\bar{X}$, no./1000 m³) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence at each transect and over all transects for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Season				Transect						All seasons and transects	
	Winter		Summer		Frechette Pt.		Lake Nicolet		Pt. aux Frenes			
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	21	10.7	295	33.9	517	49.2	9	2.6	1	0.3	170	30.2
Naididae	7	3.7	62	7.2	97	9.2	4	1.0	18	5.5	37	6.6
Mysis relicta	5	2.3	4	0.5	4	0.4	7	2.1	<1	0.1	4	0.8
Amphipoda	<1	0.2	23	2.7	5	0.5	10	3.0	26	8.3	13	2.3
Hydracarina	<1	0.2	49	5.6	5	0.4	7	2.2	85	26.8	27	4.8
Ephemeroptera	6	3.0	129	14.8	18	1.8	123	36.3	58	18.3	73	12.9
Corixidae	<1	0.1	16	1.8	<1	<0.1	1	0.2	33	10.3	9	1.6
Trichoptera	<1	0.2	53	6.1	33	3.2	29	8.5	25	7.7	29	5.2
Chaoboridae	0	0	17	1.9	29	2.7	0	0	0	0	9	1.6
Chironomidae	153	78.6	208	23.9	325	30.9	147	43.3	66	20.8	183	32.6
Total benthos w/o *Hydra*	174	89.3	576	66.1	535	50.8	330	97.4	318	99.7	392	69.8
Total benthos	195	-	871	-	1050	-	339	-	319	-	562	-
No. of taxa		37		59		64		37		25		67
Rainbow smelt	0	0	313	81.7	29	76.0	380	82.3	4	55.3	170	81.7
Yellow perch	0	0	<1	<0.1	<1	0.1	0	0	0	0	<1	<0.1
Burbot	0	0	2	0.6	3	6.6	1	0.2	0	0	1	0.6
Deepwater sculpin	0	0	<1	<0.1	<1	0.4	0	0	0	0	<1	<0.1
Lake herring	0	0	<1	0.1	0	0	<1	0.1	0	0	<1	0.1
Damaged larvae	0	0	67	17.6	7	16.9	80	17.4	3	44.7	37	17.6
Total fish larvae	0	-	383	-	39	-	462	-	8	-	208	-
Rainbow smelt	0	0	1	84.3	2	84.3	0	0	0	0	1	84.3
Unknown	0	0	<1	15.7	<1	15.7	0	0	0	0	<1	15.7
Total fish eggs	0	-	2	-	3	-	0	-	0	-	1	-
Bryum	-	0	-	2.3	-	3.8	-	0	-	0	-	1.2
Carex	-	0	-	0.3	-	0.5	-	0	-	0	-	0.2
Chara	-	1.4	-	1.7	-	3.4	-	0.4	-	1.2	-	1.5
Elodea	-	7.4	-	15.6	-	37.0	-	0	-	0	-	11.9
Equiseta	-	0	-	0.3	-	0.5	-	0	-	0	-	0.2
Isoetes	-	0	-	0.3	-	0.5	-	0	-	0	-	0.2
Lemna	-	5.4	-	1.1	-	1.9	-	0.4	-	8.9	-	3.1
Nitella	-	14.5	-	25.0	-	21.6	-	14.3	-	28.0	-	20.2
Potomageton	-	17.2	-	19.3	-	50.0	-	3.7	-	3.0	-	18.4
Typha	-	1.0	-	0	-	0	-	1.1	-	0	-	0.5
Utricularia	-	0	-	0.6	-	0	-	0.4	-	0.6	-	0.3
Unidentified	-	18.9	-	34.9	-	45.1	-	13.6	-	28.6	-	27.6
Total macrophytes	-	47.6	-	51.4	-	82.7	-	26.8	-	45.8	-	49.7
N		296		352		208		272		168		648

Table 9. Mean density ($\bar{X}$, no./1000 m³) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence at each transect during winter and summer periods for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Frechette Pt.				Lake Nicolet				Pt. aux Frenes			
	Winter		Summer		Winter		Summer		Winter		Summer	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	59	12.2	975	60.2	1	1.3	16	2.7	0	0	1	0.3
Naididae	20	4.2	174	10.7	<1	0.1	7	1.1	0	0	29	5.7
Mysis relicta	3	0.5	6	0.4	8	16.5	6	1.0	1	3.0	0	0
Amphipoda	<1	<0.1	11	0.7	<1	0.7	19	3.2	1	5.0	42	8.3
Hydracarina	1	0.1	9	0.5	0	0	14	2.3	<1	1.6	138	27.5
Ephemeroptera	2	0.4	35	2.2	12	23.8	222	37.2	<1	1.4	94	18.7
Corixidae	0	0	<1	<0.1	0	0	1	0.2	1	5.5	52	10.4
Trichoptera	1	0.2	66	4.0	0	0	55	9.1	<1	1.3	40	7.9
Chaoboridae	0	0	57	3.5	0	0	0	0	0	0	0	0
Chironomidae	391	81.2	258	15.9	28	57.3	252	42.3	17	81.7	96	19.2
Total benthos w/o *Hydra*	423	87.8	644	39.8	49	98.7	581	97.3	21	100	500	99.7
Total benthos	482	-	1619	-	49	-	597	-	21	-	502	-
No. of taxa		34		55		12		35		9		22
Rainbow smelt	0	0	59	76.0	0	0	718	82.3	0	0	7	55.3
Yellow perch	0	0	<1	0.1	0	0	0	0	0	0	0	0
Burbot	0	0	5	6.6	0	0	2	0.2	0	0	0	0
Deepwater sculpin	0	0	<1	0.4	0	0	0	0	0	0	0	0
Lake herring	0	0	0	0	0	0	1	0.1	0	0	0	0
Damaged larvae	0	0	13	16.9	0	0	152	17.4	0	0	6	44.7
Total fish larvae	0	-	77	-	0	-	872	-	0	-	12	-
Rainbow smelt	0	0	5	84.3	0	0	0	0	0	0	0	0
Unknown	0	0	1	15.7	0	0	0	0	0	0	0	0
Total fish eggs	0	-	5	-	0	-	0	-	0	-	0	-
Bryum	-	0	-	7.7	-	0	-	0	-	0	-	0
Carex	-	0	-	1.0	-	0	-	0	-	0	-	0
Chara	-	3.8	-	2.9	-	0	-	0.7	-	0	-	1.9
Elodea	-	21.9	-	52.9	-	0	-	0	-	0	-	0
Equiseta	-	0	-	1.0	-	0	-	0	-	0	-	0
Isoetes	-	0	-	1.0	-	0	-	0	-	0	-	0
Lemna	-	1.0	-	2.9	-	0.8	-	0	-	21.9	-	1.0
Nitella	-	1.9	-	41.3	-	17.2	-	11.8	-	29.7	-	26.9
Potomageton	-	42.3	-	57.7	-	4.7	-	2.8	-	1.6	-	3.8
Typha	-	0	-	0	-	2.3	-	0	-	0	-	0
Utricularia	-	0	-	0	-	0	-	0.7	-	0	-	1.0
Unidentified	-	34.6	-	55.8	-	9.4	-	17.4	-	12.5	-	38.5
Total macrophytes	-	76.9	-	88.5	-	27.3	-	26.4	-	40.6	-	49.0
N		104		104		128		144		64		104

At Point aux Frenes as at Frechette Point, the percentage of Chironomidae in the benthic drift decreased from 82% (winter) to 19% (summer) even though average density increased from 17/1000 m^3 to 96/1000 m^3. The dominant taxon in the summer benthic drift at Point aux Frenes was Hydracarina which averaged 138/1000 m^3 and made up 28% of benthic drift. Remaining abundant taxa in the benthic drift included Ephemeroptera [94/1000 m^3 (19% of benthic drift); largely *Caenis* (52/1000 m^3) and *Hexagenia* (38/1000 m^3)], Trichoptera [40/1000 m^3 (8% of benthic drift); largely *Oecetis* (37/1000 m^3)], and Naididae (29/1000 m^3, 6% of benthic drift).

Fish Larvae--

Average larval fish drift density was significantly greater at Lake Nicolet (872/1000 m^3) than at Frechette Point (77/1000 m^3) or Point aux Frenes (12/1000 m^3), with the density at Frechette Point being significantly greater than at Point aux Frenes (Table 9). In all cases, rainbow smelt larvae were dominant, making up 70-85% of total larval fish densities. When averaged over all samples, rainbow smelt constituted 82%, burbot 0.6%, lake herring 0.1%, and yellow perch and deepwater sculpin <0.1% and damaged, unidentified larvae 18% of average larval fish density. All identified eggs (84% of total eggs) were those of rainbow smelt. Fish eggs were only collected at Frechette Point (Table 8).

Macrophytes--

Based on all samples collected during winter and summer with 355-μm-mesh nets, macrophytes occurred in 50% of all samples, with the most frequently occurring taxa being *Nitella* (20% of all samples), *Potomageton* (18%), and *Elodea* (12%) (Table 8). All remaining plant taxa occurred in <4% of samples. There were no strong seasonal differences in percent occurrence of macrophytes (winter = 48% of all samples, summer = 57% of all samples). The three plant taxa previously noted were the dominant forms during both seasons. However, only 6 macrophytic taxa were collected in winter compared with 10 in the summer.

Notable percent occurrence differences for macrophytes were observed among transects. At Frechette Point, macrophytes comprised of nine taxa occurred in 83% of samples, while they were less frequent at Lake Nicolet (27%, six taxa) and Point aux Frenes (46%, five taxa). Additionally, dominant forms and diversity varied among transects. At Frechette Point, *Potomageton* (50%), *Elodea* (37%), and *Nitella* (22%) were the most frequently encountered macrophytes. At Lake Nicolet, *Nitella* (14%), *Potomageton* (4%), and *Typha* (1%) occurred in greatest

frequency. At Point aux Frenes, macrophytes occurring most often were *Nitella* (28%), *Lemna* (9%), and *Potomageton* (3%).

Seasonal comparisons at Frechette Point indicated macrophytes occurred in greater frequency and diversity in the summer (89%, nine taxa) than in winter (77%, five taxa). In addition, the dominant plants changed seasonally from *Potomageton* (42%), *Elodea* (22%), and *Chara* (4%) in winter to *Potomageton* (58%), *Elodea* (53%), and *Nitella* (41%) in summer. The most notable seasonal change for a given taxon was for *Nitella* (2% vs. 41%) (Table 8).

At Lake Nicolet, macrophytes were encountered in similar frequencies during each season (27% vs. 26%). Four plant taxa were collected during each season, but the dominant plant taxa did not change appreciably between seasons, with *Nitella* occurring most frequently.

Macrophytes occurred in slightly greater frequency and diversity in summer (49%, five taxa) when compared with winter (41%, three taxa) at Point aux Frenes. During both seasons, the most frequently occurring plant was *Nitella*, although in winter percent occurrence of *Lemna* (22%) was quite similar to that of *Nitella* (27%). Occurrence among samples for *Lemna* decreased considerably to 1% in the summer.

Seasonal and Transect Comparisons of Drift Rates and Drift Intensities

Frechette Point--

The input of water from Lake Superior to the head of the St. Marys River is apportioned so that 76% flows down the western side of Sugar Island and 24% flows into Lake George (Don Williams, personal communication, U.S. Army Corps of Engineers, Detroit District). The portion flowing into Lake George exits southward above St. Joseph Island, flowing eastward around the island, thereby not returning to the original 76% flowing west of Sugar Island (Don Williams, personal communication, U.S. Army Corps of Engineers, Detroit District). During the 23-24 February 1985 period when drift samples were collected at Frechette Point, flow at the head of the river was 1940 m^3/s. Based on a 76% diversion, 1490 m^3/s were expected to have passed our Frechette Point transect during this period. However, based on our current velocity and areal approximations for subsections of a cross-section of the river, the discharge rate was 1030 m^3/s. Due to this difference, two estimates for drift rate were determined. The first is the "calculated" drift rate which is based on our measurements and will be referred in the ensuing text simply as

drift rate(s). The second is the "adjusted" drift rate which is our calculated values adjusted upward or downward to reflect the difference between expected and calculated discharge at a given transect and season. When referring to the latter drift rate, it will be referred to specifically as "adjusted" drift rate(s).

Based on our winter discharge values, 49 m^3/s (4.8% of total) was discharged along the western shoreline (stations 1-3) at Frechette Point, 69 m^3/s (6.7% of total) along the eastern shoreline (stations 5-7), and 913 m^3/s (88.6% of total) in the navigation channel (station 4) (Table 10). The winter benthic drift rate for the entire transect was 49.0 x 10^6/24 h ("adjusted" = 70.9 x 10^6/24 h). Along the western shoreline, the benthic drift rate was 2.84 x 10^6/24 h (5.8% of total). The benthic drift rate was lowest along the eastern shoreline (0.19 x 10^6/24 h, 0.4% of total). Greatest drift rate occurred in the navigation channel (46.0 x 10^6/24 h, 93.9% of total).

Drift intensity was similar along the western shoreline (57,959) and the navigation channel (50,383) but was very low on the eastern shoreline (2754). Overall, winter drift intensity at Frechette Point was 47,573.

As only an average monthly discharge value was available to us for June [1917 m^3/s], 76% of this value (1457 m^3/s will be used as the expected discharge at Frechette Point as well as at Lake Nicolet and Point aux Frenes. Our calculated discharge estimate during June at Frechette Point was 1217 m^3/s. The percentage of discharge apportioned to river subsections during summer at Frechette Point was similar to that of winter (Table 10). The benthic drift rate for the entire transect was 151.3 x 10^6/24 h ("adjusted" = 181.4 x 10^6/24 h), while the drift rate for larval fish was 1.87 x 10^6/24 h ("adjusted" = 2.71 x 10^6/24 h).

Greatest seasonal changes in benthic drift rates at Frechette Point occurred along the eastern shoreline where the drift rate of 18.2 x 10^6/24 h (12% of total) represented a 96-fold increase when compared with winter (Table 10). Along the western shoreline, the benthic drift rate was 8.13 x 10^6/24 h (5.4% of total), while that for larval fish was 0.35 x 10^6/24 h (18.7% of total). In the navigation channel, benthic drift rate (124.9 x10^6/24 h, 82.6% of total) and larval fish drift rate (1.43 x 10^6/24 h, 76.5% of total) were greater than those observed along either shoreline.

Benthic drift intensity was greatest on the eastern side of the river (193,617), but larval fish drift rate (0.09 x10^6/24 h, 4.8% of total) and drift intensity (957) were the lowest among the three subsection of the river at Frechette Point. While benthic drift intensity along the western shoreline (127,031) was

Table 10. Estimates for discharge (m^3/s), benthic and larval fish drift rates (no. x 10^6/24 h), and benthic and larval fish drift intensities during winter and summer at Frechette Point, St. Marys River, 1985. Density estimates based on 355-um-mesh nets. See *Discussion* for explanation of "calculated" and "adjusted" differences. Percentage of total expressed as %T. Ratio is summer value divided by winter value.

Parameter	Western shoreline		Navigation channel		Eastern shoreline		Whole transect
	Quantity	%T	Quantity	%T	Quantity	%T	
Winter							
Discharge							
Expected							1490
Calculated	49	4.8	913	88.6	69	6.7	1030
Adjusted	71		1321		100		1490
Benthos							
Drift rate							
Calculated	2.84	5.8	46.0	93.9	0.19	0.4	49.0
Adjusted	4.11		66.5		0.27		70.9
Drift intensity	57,959		50,383		2754		47,573
Summer							
Discharge							
Expected							1457
Calculated	64	5.3	1059	87.0	94	7.7	1217
Adjusted	77		1268		113		1457
Benthos							
Drift rate							
Calculated	8.13	5.4	124.9	82.6	18.2	12.0	151.3
Adjusted	9.73		149.5		21.8		181.4
Drift intensity	127,031		117,941		193,617		124,322
Fish larvae							
Drift rate							
Calculated	0.35	18.7	1.43	76.5	0.09	4.8	1.87
Adjusted	0.51		2.07		0.13		2.71
Drift intensity	5469		1350		957		1537
Ratio							
Benthic drift rate	2.86		2.72		95.8		3091
Benthic drift intensity	2.19		2.34		70.3		2.61
Benthic drift density	1.85		2.14		58.3		3.36

similar to that of the navigation channel (117,941), larval fish drift intensity was much greater on the western shoreline (5469) when compared with the navigation channel (1350) and the eastern shoreline. Overall, larval fish drift intensity for the transect was 1537, while that for benthos was 124,322. For the benthos, this drift intensity represented a 261% increase from winter to summer (Table 10).

Lake Nicolet--

Discharge at the head of the river during the 2-7 March 1985 period when drift samples were collected at the Lake Nicolet transect was 2005 m^3/s. Based on a 76% apportionment of flow, we expected a discharge of 1524 m^3/s at our Lake Nicolet transect. Our discharge calculation was 1578 m^3/s. Percent discharge attributable to each river subsection was fairly similar (Table 11). The benthic drift rate for the entire transect during winter was 2.83 x 10^6/24 h ("adjusted" = 2.73 x 10^6/24 h). Greatest benthic drift rates were calculated for the eastern (stations 7-9) (0.93 x 10^6/24 h, 32.9% of total) and middle (station 5) (0.82 x 10^6/24 h, 29.0% of total) subsections of the river. The lowest benthic drift rate was calculated for the upbound channel (0.21 x 10^6/24 h, 7.4% of total). Benthic drift rates were 0.32 x 10^6/24 h (11.3% of total) on the western shore and 0.55 x 10^6/24 h (19.4% of total) in the downbound channel (Table 11).

Greatest benthic drift intensity occurred on the eastern shoreline (3310) and least in the upbound channel (857). benthic drift intensities in remaining subsections of the river were similar ranging from 1441 to 1687. Overall, the benthic drift intensity for the transect during winter was 1793 (Table 11).

As at Frechette Point, expected discharge at our Lake Nicolet transect during June was 1457 m^3/s. Based on our measurements, we calculated a discharge of 1282 m^3/s. Percentage distribution of the water mass attributable to each subsection of the river varied little seasonally. The benthic drift rate for the entire Lake Nicolet transect during June was 29.0 x 10^6/24 h ("adjusted" = 33.0 x 10^6/24 h). Relative to the winter, benthic drift rate increased by a factor of 10.2 in summer (Table 11). In all comparisons of summer and winter benthic drift rates within each river subsection, those in summer were greater. Summer benthic drift rates were lowest along the shorelines (2.90-3.70 x 10^6/24 h) and were similarly high in remaining subsections (6.01-8.40 x 10^6/24 h). Most notable increases in the percentage of total benthic drift rate were for the two navigation channels. In the downbound channel, the percentage of total drifting benthos increased from 19.4% in winter to 29.0% in summer. In the upbound channel, the increase was from 7.4% in

Table 11. Estimates for discharge (m^3/s), benthic and larval fish drift rates (no. x 10^6/24 h), and benthic and larval fish drift intensities during winter and summer at Lake Nicolet, St. Marys River, 1985. Density estimates based on 355-um-mesh nets. See Discussion for explanation of "calculated" and "adjusted" differences. Percentage of total expressed as %T. Ratio is summer value divided by winter value. Asterisk (*) associated with mid-lake value is derived from current velocities and densities at stations 2-3 and 7-8 because no samples were collected at this location in winter.

Parameter	Western shoreline		Downbound navigation channel		Mid-lake		Upbound navigation channel		Eastern shoreline		Whole transect
	Quantity	%T	Quantity	%T	Quantity	%T	Quantity	%T	Quantity	%T	
Winter											
Discharge											
Expected											1524
Calculated	222	14.1	346	21.9	486*	30.8	245	15.5	281	17.5	1578
Adjusted	214		334		469		237		271		1524
Benthos											
Drift rate											
Calculated	0.32	11.3	0.55	19.4	0.82*	29.0	0.21	7.4	0.93	32.9	2.83
Adjusted	0.31		0.53		0.79*		0.20		0.90		2.73
Drift intensity	1441		1590		1687*		857		3310		1793
Summer											
Discharge											
Expected											1457
Calculated	210	16.4	207	16.1	399	31.1	290	22.6	177	13.8	1282
Adjusted	239		235		453		330		201		1457
Benthos											
Drift rate											
Calculated	2.90	10.0	8.40	29.0	7.98	27.5	6.01	20.7	3.70	12.8	29.0
Adjusted	3.30		9.55		9.07		6.83		4.21		33.0
Drift intensity	13,810		40,580		20,000		20,724		20,904		22,621
Fish larvae											
Drift rate											
Calculated	11.2	6.4	8.76	5.0	126.4	71.8	13.7	7.8	15.9	9.0	175.9
Adjusted	12.7		9.96		143.7		15.6		18.1		199.9
Drift intensity	53,333		42,319		316,792		47,241		89,831		137,207
Ratio											
Benthic drift rate	9.06		15.3		9.73		28.6		3.98		10.2
Benthic drift intensity	9.58		25.5		11.9		24.2		6.32		12.6
Benthic drift density	34.9		29.0		-		39.1		4.43		12.2

winter to 20.7% in summer. Consequently, during winter 26.8% of drifting benthos was in the two channels, while during summer the portion of drifting benthos in the two channels increased to 49.7%. The most notable decrease occurred along the eastern shoreline where the percentage of the total benthic drift rate decreased from 32.9% in winter to 12.8% in summer. Regardless of benthic drift rate differences among river subsections, benthic drift intensities were very similar in all subsections (13,810-20,904) except in the downbound channel where benthic drift intensity was 40,500. The benthic drift intensity for the entire Lake Nicolet transect was 22,621 which represented an increase by a factor of 12.6 compared with winter.

Larval fish drift rate during summer was 175.9 x 10^6/24 h ("adjusted" = 199.9 x 10^6/24 h). Seventy-two percent (126.4 x 10^6/24 h) of the total larval fish drift rate originated in the middle portion of Lake Nicolet (station 5). Larval fish drift rates in other subsections of the river were similar and much lower than in the middle subsection ranging from 8.76 x 10^6/24 h to 15.9 x 10^6/24 h (5-9% of total).

For the transect as a whole, larval fish drift intensity was 137,207. However, all values except that for the middle portion of the river were much lower than that for the whole transect ranging from 42,319 to 89,831. Larval fish drift intensity for the middle portion of the river was very large (316,792) (Table 11).

Point aux Frenes--

Winter drift rates and intensities were not calculated at Point aux Frenes since only stations 1-4 could be sampled. During summer, the expected discharge at Point aux Frenes was the same as that used at Frechette Point and Lake Nicolet (1457 m^3/s). Based on our measurements and an average navigation channel depth of 10 m, we calculated a discharge of 2248 m^3/s, with 67.7% (1509 m^3/s) flowing down the navigation channel, 17.2% (384 m^3/s) along the western shoreline, and 15.4% (345 m^3/s) along the eastern shoreline. The benthic drift rate at Point aux Frenes was 2.39 x 10^6/24 h ("adjusted" = 15.9 x 10^6/24 h). With respect to river subsections, benthic drift rates decreased eastward, with 9.67 x 10^6/24 h (40.4% of total) on the western shore, 8.22 x 10^6/24 h (34.4% of total) in the channel, and 6.02 x 10^6/24 h (25.2% of total) on the eastern shore (Table 12).

Benthic drift intensity for the entire transect was 10,679. Highest benthic drift intensity occurred on the eastern shore (25,182) and lowest in the channel (5447) (Table 12).

Table 12. Estimates for discharge (m^3/s), benthic and larval fish drift rates (no. x 10^6/24 h), and benthic and larval fish drift intensities during summer at Point aux Frenes, St. Marys River, 1985. Density estimates based on 355-um-mesh nets. See Discussion for explanation of "calculated" and "adjusted" differences. Percentage of total expressed as %T.

	Western shoreline		Navigation channel		Eastern shoreline		
Parameter	Quantity	%T	Quantity	%T	Quantity	%T	Whole transect
Summer							
Discharge							
Expected							1457
Calculated	384	17.2	1509	67.4	345	15.4	2238
Adjusted	250		982		225		1457
Benthos							
Drift rate							
Calculated	9.67	40.4	8.22	34.4	6.02	25.2	23.9
Adjusted	6.30		5.35		3.92		15.9
Drift intensity	25,182		5447		17,449		10,679
Fish larvae							
Drift rate							
Calculated	0.027	0.6	4.34	94.4	0.23	5.0	4.60
Adjusted	0.018		2.83		0.15		2.99
Drift intensity	70		2876		667		2055

Larval fish drift rate for the entire transect was 4.60 x 10^6/24 h ("adjusted" = 2.99 x 10^6/24 h). Maximum larval fish drift rate and drift intensity occurred in the navigation channel [4.34 x 10^6/24 h (94.4% of total) and 2876, respectively]. Although benthic drift rate was greatest on the western shore, larval fish drift rate was lowest (0.027 x 10^6/24 h, 0.6% of total). In addition, larval fish drift intensity was very low (70). Although higher than along the western shore, larval fish drift rate and drift intensity were still both low on the eastern shore [0.23 x 10^6/24 h (5.0% of total) and 667, respectively) (Table 12).

Diel Comparisons of Drift Densities

Benthos--

Comparisons of diel benthic drift densities during both winter and summer at each transect indicated night abundances were significantly greater than daytime densities for all comparisons except at Frechette Point in summer. In this latter comparison, daytime benthic density [2488/1000 m^3; largely *Hydra* (74%)] was significantly greater than the night benthic density estimate (750/1000 m^3). Among comparisons having significantly greater night densities, abundances at night increased over day densities from a minimum of 882% to a maximum of 2198%. At each transect, the number of taxa collected was greatest in night samples regardless of season.

Daytime benthic drift density at Frechette Point was distinguished from that at Lake Nicolet and Point aux Frenes during both winter and summer due to a large component attributable to *Hydra* (Table 13). Daytime winter drift at Frechette Point averaged 97/1000 m^3 and was comprised primarily of *Hydra* (54/1000 m^3), Chironomidae (26/1000 m^3), and Naididae (13/1000 m^3). Similar estimates at night averaged 866/1000 m^3, with Chironomidae (756/1000 m^3), *Hydra* (64/1000 m^3), and Naididae (28/1000 m^3) being the most numerous drifting benthos. During summer, daytime benthic drift averaged 2488/1000 m^3 and was dominated by *Hydra* (1836/1000 m^3), Naididae (303/1000 m^3), and Chironomidae (244/1000 m^3). At night, average benthic drift density (750/1000 m^3) decreased with Chironomidae (272/1000 m^3), Trichoptera [126/1000 m^3; largely *Oecetis* (102/1000 m^3)], *Hydra* (144/1000 m^3), and Chaoboridae (87/1000 m^3) the dominant taxa.

At Lake Nicolet, average daytime winter benthic density was low (4.3/1000 m^3), with the dominant taxa being Chironomidae (2.6/1000 m^3), *Hydra* (1.0/1000 m^3), and Ephemeroptera (0.5/1000 m^3). At night, benthic drift density increased to 95/1000 m^3. While Chironomidae remained the dominant taxon (54/1000 m^3),

Table 13. Diel mean density ($\bar{X}$, *no./1000 m³*) *and percentage of average total density (%T) for* benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence at each transect during winter and summer periods for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Frechette Pt.							
	Winter				Summer			
	Day		Night		Day		Night	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	54	55.3	64	7.4	1836	73.8	114	15.1
Naididae	13	12.9	28	3.3	303	12.2	44	5.9
Mysis relicta	0	0	5	0.6	2	0.1	10	1.3
Amphipoda	<1	0.2	<1	<0.1	10	0.4	11	1.4
Hydracarina	1	1.2	<1	<0.1	11	0.4	7	0.9
Ephemeroptera	1	1.3	3	0.3	5	0.2	65	8.7
Corixidae	0	0	0	0	0	0	<1	<0.1
Trichoptera	1	0.5	2	0.2	5	0.2	126	16.8
Chaoboridae	0	0	0	0	27	1.1	87	11.7
Chironomidae	26	26.7	756	87.3	244	9.8	272	36.2
Total benthos w/o *Hydra*	44	44.7	803	92.6	652	26.2	637	84.9
Total benthos	97	-	866	-	2488	-	750	-
No. of taxa		20		31		38		41
Rainbow smelt	0	0	0	0	74	84.0	44	65.5
Yellow perch	0	0	0	0	<1	0.2	0	0
Burbot	0	0	0	0	8	9.3	2	3.0
Deepwater sculpin	0	0	0	0	<1	0.2	<1	0.6
Damaged larvae	0	0	0	0	6	6.3	21	30.9
Total fish larvae	0	-	0	-	88	-	67	-
Rainbow smelt	0	0	0	0	8	83.2	1	100
Unknown	0	0	0	0	2	16.8	0	0
Total fish eggs	0	-	0	-	10	-	1	-
N		52		52		52		52

Table 13. Continued.

Taxon	Lake Nicolet							
	Winter				Summer			
	Day		Night		Day		Night	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	1	22.5	<1	0.4	18	21.6	15	1.3
Naididae	<1	2.2	0	0	6	7.0	7	0.6
Mysis relicta	0	0	16	17.2	<1	0.4	12	1.1
Amphipoda	0	0	1	0.7	2	2.2	37	3.3
Hydracarina	0	0	0	0	6	7.6	22	1.9
Ephemeroptera	1	11.4	23	24.4	2	2.1	442	39.8
Corixidae	0	0	0	0	1	1.5	2	0.1
Trichoptera	0	0	0	0	5	5.7	104	9.4
Chaoboridae	0	0	0	0	0	0	0	0
Chironomidae	3	60.3	54	57.2	41	49.0	464	41.8
Total benthos w/o _Hydra_	3	77.5	94	99.6	66	78.4	1096	98.7
Total benthos	4	-	95	-	84	-	1110	-
No. of taxa		7		9		19		29
Rainbow smelt	0	0	0	0	389	81.8	1047	82.5
Burbot	0	0	0	0	3	0.6	1	0.1
Lake herring	0	0	0	0	0	0	1	0.1
Damaged larvae	0	0	0	0	84	17.6	220	17.3
Total fish larvae	0	-	0	-	475	-	1269	-
N		64		64		72		72

Table 13. Continued.

Taxon	Pt. aux Frenes							
	Winter				Summer			
	Day		Night		Day		Night	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	0	0	0	0	3	2.6	0	0
Naididae	0	0	0	0	24	23.5	33	3.7
Mysis relicta	0	0	1	3.2	0	0	0	0
Amphipoda	<1	13.5	2	4.4	2	1.8	82	9.1
Hydracarina	0	0	1	1.7	31	30.7	244	27.1
Ephemeroptera	0	0	1	1.5	3	2.5	185	20.6
Corixidac	1	41.7	1	2.9	12	12.0	92	10.2
Trichoptera	0	0	1	1.4	3	2.4	76	8.5
Chaoboridae	0	0	0	0	0	0	0	0
Chironomidae	1	37.9	34	84.9	19	19.0	173	19.2
Total benthos w/o *Hydra*	3	100	40	100	100	97.4	901	100
Total benthos	3	-	40	-	102	-	901	-
No. of taxa		4		8		13		19
Rainbow smelt	0	0	0	0	5	58.1	9	54.0
Damaged larvae	0	0	0	0	3	41.9	8	46.0
Total fish larvae	0	-	0	-	8	-	17	-
N		32		32		52		52

Ephemeroptera made up 24% and *Mysis relicta* 17% of benthic drift (Table 13).

Lake Nicolet summer daytime benthic drift abundance averaged 84/1000 m^3 and was dominated by Chironomidae (41/1000 m^3) and *Hydra* (18/1000 m^3). Average summer benthic drift increased considerably at night (1110/1000 m^3), with Chironomidae (464/1000 m^3), Ephemeroptera (442/1000 m^3), and Trichoptera (104/1000 m^3) being the most abundant components. Of the mayflies, *Hexagenia* was the most-numerous averaging 310/1000 m^3 of summer night benthic drift. Similarly, among caddisflies, *Oecetis* was the most abundant averaging 93/1000 m^3.

At Point aux Frenes, average winter benthic drift abundance increased from 3/1000 m^3 in the daytime to 40/1000 m^3 at night. A similar diel trend was observed during the summer where average benthic drift increased from 102/1000 m^3 during the day to 901/1000 m^3 at night. Chironomidae and Corixidae were the most abundant taxa (1/1000 m^3) in daytime winter benthic drift samples; whereas, the night estimate was dominated by Chironomidae (34/1000 m^3) (Table 13).

During summer at Point aux Frenes for both day and night, Chironomidae made up only 19% of benthic drift which averaged 102/1000 m^3 during the day and 901/1000 m^3 at night (Table 13). The most abundant drifting taxa during the day were Hydracarina (31/1000 m^3), Naididae (24/1000 m^3), and Corixidae (12/1000 m^3). At night, Hydracarina remained the most numerous drifting taxon collected averaging 244/1000 m^3. Other major components included Ephemeroptera [85/1000 m^3; largely *Caenis* (102/1000 m^3) and *Hexagenia* (76/1000 m^3)], Corixidae (92/1000 m^3), Amphipoda (82/1000 m^3), and Trichoptera [76/1000 m^3; largely *Oecetis* (75/1000 m^3)].

Fish Larvae--

Diel larval fish drift densities were significantly different only at Lake Nicolet where densities during the night (1269/1000 m^3) exceeded day densities (475/1000 m^3) by a factor of 2.67 (Table 13). At Frechette Point, average day larval fish drift density (88/1000 m^3) exceeded night density (67/1000 m^3), but the difference was not significant. At Point aux Frenes, night density of larval fish drift (17/1000 m^3) was twice that of daytime density, but the difference was not significant.

Macrophytes--

When examining diel differences pooled over all transects and stations, percent occurrence of macrophytes was low.

Macrophytes occurred in 54% of day samples and 46% of night samples. Dominant plant taxa were *Potomageton* (23%), *Nitella* (22%), and *Elodea* (14%) in day samples; whereas, at night dominant forms were *Nitella* (19%), *Potomageton* (14%), and *Elodea* (10%). The number of taxa collected during day and night samples was the same (nine taxa), with two taxa encountered only during the day and another two only at night.

Depth Strata Comparisons of Drift Densities

Frechette Point--

Nearly all estimates of benthic drift density at all transects, regardless of mesh size, had lowest abundances at the surface and greatest at the bottom. However, during winter at Frechette Point, benthic drift was greatest near bottom (630/1000 m^3) and least at mid-depth (289/1000 m^3). In spite of this deviation from the general trend, there were no significant density differences among the three depth strata estimates of total benthic drift density during the winter.

Regardless of water column depth during the winter at Frechette Point, benthic drift was dominated by Chironomidae (81-85%) (Table 14). Remaining taxa contributing substantively to the drift were Naididae and *Hydra* which cumulatively made up 12-17% of the drifting benthos.

Summer benthic drift density estimates among depth strata sampled were significantly different. The surface estimate of total benthic drift density (135/1000 m^3) was significantly lower than either mid-depth (490/1000 m^3) or bottom (827/1000 m^3) estimates, which were not significantly different.

At all depth strata, *Hydra* was the dominant taxon during summer making up 57-92% of the drifting benthos. The percentage of total drifting benthos attributable to *Hydra* decreased from surface to bottom even though density increased. As during the winter only two other taxa contributed moderate numbers to the drifting benthos; Naididae and Chironomidae. These two taxa combined made up 17-28% of total benthic drift density, with densities increasing from surface to bottom. During winter and summer, greatest densities of *Mysis relicta* occurred in surface waters and decreased from surface to bottom. Finally, during both winter and summer, the number of taxa collected was least at the surface (7 taxa, winter) and greatest at the bottom (51 taxa, summer).

There were two general trends with respect to drifting benthos and depth strata. First, benthic drift density was dominated by Chironomidae in winter and *Hydra* in summer,

Table 14. Mean density ($\bar{X}$, no./1000 m³) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs at each transect during winter and summer periods for components of the drift collected with 355-um mesh nets at the three depth strata (surface, mid-depth, bottom) sampled in the St. Marys River, 1985. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Frechette Pt.											
	Winter						Summer					
	Surface		Mid-depth		Bottom		Surface		Mid-depth		Bottom	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	13	3.2	28	9.7	87	13.8	345	71.8	935	65.6	1093	56.9
Naididae	36	8.9	16	5.7	21	3.3	17	3.4	114	8.0	239	12.4
Mysis relicta	5	1.3	3	0.9	2	0.4	11	2.2	6	0.4	5	0.3
Amphipoda	1	0.2	0	0	<1	<0.1	2	0.4	4	0.3	16	0.9
Hydracarina	0	0	1	0.5	<1	<0.1	4	0.8	3	0.2	13	0.7
Ephemeroptera	1	0.2	1	0.4	3	0.5	2	0.4	20	1.4	50	2.6
Corixidae	0	0	0	0	0	0	0	0	1	<0.1	0	0
Trichoptera	0	0	<1	0.1	2	0.3	29	6.1	54	3.8	79	4.1
Chaoboridae	0	0	0	0	0	0	0	0	32	2.2	84	4.3
Chironomidae	346	85.4	235	81.8	509	80.8	63	13.2	232	16.3	305	15.9
Total benthos w/o *Hydra*	392	96.8	261	90.3	543	86.2	135	28.2	490	34.4	827	43.1
Total benthos	405	-	289	-	630	-	480	-	1425	-	1920	-
No. of taxa		7		18		30		13		32		51
Rainbow smelt	0	0	0	0	0	0	45	88.5	75	78.4	49	72.3
Yellow perch	0	0	0	0	0	0	0	0	0	0	<1	0.2
Burbot	0	0	0	0	0	0	4	7.5	7	6.8	4	6.3
Deepwater sculpin	0	0	0	0	0	0	0	0	0	0	1	0.8
Damaged larvae	0	0	0	0	0	0	2	4.0	14	14.8	14	20.4
Total fish larvae	0	-	0	-	0	-	50	-	96	-	67	-
Rainbow smelt	0	0	0	0	0	0	6	70.0	3	82.9	5	88.1
Unknown	0	0	0	0	0	0	3	30.0	1	17.1	1	11.9
Total fish eggs	0	-	0	-	0	-	9	-	4	-	6	-
N		8		40		56		8		40		56

Table 14. Continued.

Taxon	Lake Nicolet											
	Winter						Summer					
	Surface		Mid-depth		Bottom		Surface		Mid-depth		Bottom	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
<u>Hydra</u>	0	0	1	4.0	1	0.9	16	7.1	16	2.6	17	2.5
Naididae	0	0	<1	<1	0	0	4	1.9	2	0.4	10	1.6
<u>Mysis relicta</u>	3	63.4	7	32.5	11	13.0	6	2.7	7	1.1	6	0.9
Amphipoda	0	0	0	0	1	0.8	4	1.6	7	1.1	32	4.9
Hydracarina	0	0	0	0	0	0	2	1.1	6	1.0	23	3.5
Ephemeroptera	0	0	4	20.2	21	24.8	88	40.2	319	50.4	176	27.0
Corixidae	0	0	0	0	0	0	0	0	2	0.3	1	0.2
Trichoptera	0	0	0	0	0	0	9	4.1	50	7.8	68	10.5
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	2	36.6	9	42.7	50	60.2	89	40.6	219	34.6	314	48.2
Total benthos w/o <u>Hydra</u>	4	100	19	96.0	82	99.1	204	92.9	618	97.4	636	97.5
Total benthos	4	-	20	-	83	-	220	-	634	-	652	-
No. of taxa		2		6		11		10		29		27
Rainbow smelt	0	0	0	0	0	0	503	75.5	1173	86.5	411	76.1
Burbot	0	0	0	0	0	0	0	0	4	0.3	1	0.1
Lake herring	0	0	0	0	0	0	0	0	0	0	1	0.2
Damaged larvae	0	0	0	0	0	0	163	24.5	179	13.2	127	23.6
Total fish larvae	0	-	0	-	0	-	667	-	1357	-	540	-
N		16		48		64		16		56		72

Table 14. Continued.

Taxon	Pt. aux Frenes											
	Winter						Summer					
	Surface		Mid-depth		Bottom		Surface		Mid-depth		Bottom	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	0	0	0	0	0	0	0	0	1	0.2	2	0.3
Naididae	0	0	0	0	0	0	0	0	14	4.4	43	6.1
Mysis relicta	1	21.8	<1	0.8	1	3.1	0	0	0	0	0	0
Amphipoda	1	10.9	0	0	2	7.8	0	0	35	11.2	53	7.5
Hydracarina	0	0	0	0	1	2.7	24	45.2	108	34.5	176	25.0
Ephemeroptera	0	0	0	0	1	2.3	4	7.8	67	21.4	126	18.0
Corixidae	0	0	0	0	2	9.3	0	0	6	2.0	92	13.2
Trichoptera	0	0	0	0	1	2.3	8	15.7	14	4.3	63	8.9
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	4	67.3	21	98.0	18	72.4	17	31.3	65	20.8	130	18.6
Total benthos w/o *Hydra*	6	100	21	100	25	100	53	100	312	99.8	699	99.7
Total benthos	6	-	21	-	25	-	53	-	313	-	701	-
No. of taxa		3		3		8		4		13		22
Rainbow smelt	0	0	0	0	0	0	29	69.5	7	78.9	4	33.4
Damaged larvae	0	0	0	0	0	0	13	30.5	2	21.1	7	66.6
Total fish larvae	0	-	0	-	0	-	41	-	9	-	11	-
N		8		24		32		8		40		56

regardless of depth strata. Second, density and diversity of the drifting benthos were greatest near bottom during both seasons.

There were no significant larval fish drift density differences among depth strata sampled. Greatest numbers of fish larvae were collected at mid-depth (96/1000 m^3); the least occurred at the surface (50/1000 m^3).

Lake Nicolet--

Benthic drift density and diversity at Lake Nicolet were considerably reduced at all depths when compared with those at Frechette Point. However, both parameters had trends similar to those at Frechette Point with increasing abundance and diversity from surface to bottom regardless of season (Table 14). However, only during winter were density estimates of total benthic drift significantly different, with the bottom (83/1000 m^3) and surface (4/1000 m^3) estimates being different. The mid-depth density estimate (20/1000 m^3) was not significantly different from surface or bottom estimates.

The winter surface estimate of drifting benthos was dominated by *M. relicta* (63%, but only 2.6/1000 m^3) and Chironomidae. At mid-depth, while abundance of *M. relicta* increased to 6.5/1000 m^3, its percentage of drifting benthos decreased to 33% due to increases in other components of the benthos, largely Chironomidae and Ephemeroptera. At bottom, *M. relicta* increased to a maximum of 10.8/1000 m^3, but its percentage of drifting benthos continued to decrease to 13%; once again due to increases in chironomids and ephemeropterans.

During summer, density and diversity estimates were considerably greater than during winter. However, regardless of depth, the chironomids and ephemeropterans made up 75-85% of total benthic drift density. *Mysis relicta* occurred in densities similar to those of winter ranging from 5.6/1000 m^3 to 6.7/1000 m^3 (Table 14).

The general pattern of drifting benthos with respect to depth at Lake Nicolet was one of increasing density and diversity from surface to bottom depth strata. Winter estimates of drifting benthos were dominated by chironomids and mysids at the surface and these two taxa plus ephemeropterans at remaining depths. Summer estimates of these two parameters were greater than winter estimates and were dominated by chironomids and ephemeropterans, with densities of mysids being similar at all depth strata.

Comparisons of larval fish drift at Lake Nicolet indicated mid-depth (1357/1000 m^3) and surface (667/1000 m^3) densities were

significantly greater than at the bottom (540/1000 m^3). There was no significant difference between mid-depth and surface density estimates of larval fish drift.

Point aux Frenes--

As with Lake Nicolet and Frechette Point, benthic density and diversity increased with increasing depth strata and overall were greater in summer when compared with winter. Winter benthic density and diversity estimates at Point aux Frenes were most similar to those at Lake Nicolet. Comparisons of depth strata estimates for total benthic drift density were non-significant. Chironomidae was the dominant taxon making up 67-98% of total benthic drift density (Table 14). Although *M. relicta* comprised 22% of the surface total benthic drift density, average density was only 1.4/1000 m^3, with even lower abundances at remaining depth strata. Other components of the benthos, mostly Corixidae (9.3% of benthic drift and Amphipoda (7.8%), made up moderate amounts of benthic drift only at the bottom depth stratum.

During summer, total benthic drift densities on the bottom and at mid-depth were significantly greater than at the surface. Hydracarina was the most numerous taxon encountered in the drifting benthos at each depth strata. Chironomidae and Ephemeroptera were the second- and third-most abundant taxa in the drifting benthos at mid-depth and bottom. No mysids were collected during the summer at Point aux Frenes.

The general trend for drifting benthos at Point aux Frenes was for density and diversity to increase from surface to bottom depth strata during both seasons. Winter benthic drift was dominated by Chironomidae at all strata, while in summer drifting benthos, Hydracarina, Chironomidae, and Ephemeroptera were all numerous benthic forms.

At Point aux Frenes, larval fish drift density was significantly greater at the surface (41/1000 m^3) when compared with bottom (11/1000 m^3) and mid-depth (9/1000 m^3). The density difference between the latter two depth strata was non-significant.

When examining depth strata pooled over all transects and stations, percent occurrence of macrophytes was similar at surface (48%), mid-depth (44%), and bottom (54%) depth strata. All three depth strata were dominated by the same macrophytes; *Nitella*, *Potomageton*, and *Elodea*. Surface samples were characterized by only five taxa; whereas, remaining depth strata each had nine plant taxa.

Station Density Comparisons Within Transects

Frechette Point--

Comparison of total benthic drift density during the winter indicated stations 1-4 had significantly greater abundances of drifting benthos (535-1216/1000 m^3) than did stations 5-7 (20-38/1000 m^3) (Table 15). In addition, greatest diversity was present at stations 2-4 (14-21 taxa), with remaining stations having ≤8 taxa present. Although densities of *Hydra* did not strongly differ across stations (4-212/1000 m^3), it made up a considerably greater portion of the drifting benthos at stations 5 and 6 (65-70%) than at remaining stations (≤20%). At these latter stations, Chironomidae was the dominant form (83-99%). *Mysis relicta* occurred in similar densities at all stations (0-7/1000 m^3) but was generally greatest in abundance at stations 1-4.

There were no significant station differences for total benthic drift density during summer. However, all major components of the benthic drift except Ephemeroptera and Hydracarina had maximal densities at stations 1-3. The proportion of total benthic drift density excluding *Hydra* decreased from station 1 (75%) to station 7 (32%). Excluding station 1 (20 taxa), the number of taxa collected at each station during the summer declined in the same manner that total benthic drift density without *Hydra* did, with greatest diversity at station 2 (33 taxa) and least at station 7 (21 taxa).

Greatest numbers of fish larvae were captured at stations 4, 5, and 6 (85-139/1000 m^3), with those at station 5 being the highest (Table 15). Remaining station density estimates ranged from 41/1000 m^3 to 56/1000 m^3. However, there were no significant differences in larval fish drift densities among stations.

The only macrophyte taxon occurring at all stations, regardless of season, was *Potomageton* (Table 15). During winter, *Elodea* occurred only at stations 1-4, and stations 5-7 had only *Potomageton* present (except station 7 which had two samples with *Chara*). During summer, *Potomageton*, *Elodea*, and *Nitella* occurred at nearly all stations. Remaining plant taxa occurred randomly among stations, except *Bryum* which was notably frequent at station 7. During both seasons, station 4 had the most diverse assortment of macrophytes.

Lake Nicolet--

No significant differences in total benthic drift density among stations were evident during either winter or summer. In addition, at most stations the number of taxa collected was

Table 15. Mean density ($\bar{X}$, no./1000 m^3) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence for each station at Frechette Point during winter and summer periods for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Station mean densities pooled over all depths sampled and time periods within each season. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Frechette Pt. - Winter - 355 um													
	Stn. 1		Stn. 2		Stn. 3		Stn. 4		Stn. 5		Stn. 6		Stn. 7	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	8	1.1	61	9.0	212	17.4	35	6.6	25	70.4	25	65.3	4	20.3
Naididae	11	1.6	30	4.4	68	5.6	16	2.9	1	2.1	5	13.9	0	0
Mysis relicta	3	0.4	7	1.1	2	0.2	3	0.6	1	2.1	0	0	3	17.0
Amphipoda	0	0	1	0.1	<1	<0.1	<1	<0.1	0	0	0	0	0	0
Hydracarina	0	0	0	0	4	0.3	<1	<0.1	0	0	0	0	0	0
Ephemeroptera	1	0.2	1	0.2	3	0.2	1	0.2	2	6.3	0	0	9	48.6
Corixidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera	1	0.1	1	0.2	4	0.3	1	0.2	0	0	0	0	0	0
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	674	96.4	574	84.5	904	74.3	475	88.7	5	15.1	8	20.8	3	17.0
Total benthos w/o Hydra	692	98.9	618	91.0	1004	82.6	500	93.4	10	29.6	13	34.7	16	82.5
Total benthos	699	-	680	-	1216	-	535	-	35	-	38	-	20	-
No. of taxa		7		14		21		20		8		3		7
Chara	-	0	-	6.3	-	0	-	4.2	-	0	-	0	-	25.0
Elodea	-	37.5	-	18.8	-	18.8	-	54.2	-	0	-	0	-	0
Lemna	-	0	-	0	-	0	-	4.2	-	0	-	0	-	0
Nitella	-	0	-	0	-	0	-	8.3	-	0	-	0	-	0
Potomageton	-	25.0	-	62.5	-	62.5	-	33.3	-	50.0	-	31.3	-	12.5
Unidentified	-	12.5	-	31.3	-	50.0	-	29.2	-	25.0	-	50.0	-	37.5
Total macrophytes	-	62.5	-	93.8	-	87.5	-	83.3	-	68.8	-	75.0	-	37.5
N		8		16		16		24		16		16		8

Table 15. Continued.

Taxon	Frechette Pt. - Summer - 355 um													
	Stn. 1		Stn. 2		Stn. 3		Stn. 4		Stn. 5		Stn. 6		Stn. 7	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	465	24.7	613	35.1	768	52.8	828	72.4	1460	74.9	1498	77.1	1044	67.7
Naididae	140	7.5	474	27.1	213	14.7	88	7.7	135	6.9	90	4.6	30	1.9
Mysis relicta	13	0.7	7	0.4	8	0.6	8	0.7	2	0.1	4	0.2	0	0
Amphipoda	34	1.8	13	0.8	1	0.1	1	0.1	16	0.8	4	0.2	31	2.0
Hydracarina	5	0.3	6	0.4	3	0.2	4	0.3	4	0.2	13	0.7	42	2.8
Ephemeroptera	32	1.7	25	1.5	32	2.2	10	0.8	14	0.7	21	1.1	207	13.4
Corixidae	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0
Trichoptera	169	9.0	117	6.7	113	7.8	41	3.6	22	1.1	25	1.3	5	0.3
Chaoboridae	395	21.0	107	6.1	66	4.5	1	0.1	0	0	0	0	0	0
Chironomidae	588	31.2	366	20.9	233	16.0	156	13.6	234	12.0	260	13.4	112	7.3
Total benthos w/o *Hydra*	1419	75.3	1136	64.9	688	47.2	316	27.6	488	25.1	444	22.9	499	32.3
Total benthos	1884	-	1749	-	1456	-	1144	-	1948	-	1943	-	1543	-
No. of taxa		20		33		27		26		22		22		21
Rainbow smelt	18	44.6	30	68.0	46	81.9	76	85.7	105	75.7	61	71.7	33	67.4
Yellow perch	0	0	0	0	0	0	<1	0.4	0	0	0	0	0	0
Burbot	5	11.6	3	7.4	2	3.5	4	4.0	8	5.7	11	12.4	4	7.3
Deepwater sculpin	0	0	0	0	0	0	1	1.4	0	0	0	0	0	0
Damaged larvae	18	43.8	11	24.7	8	14.6	7	8.4	26	18.6	13	15.9	12	25.3
Total fish larvae	41	-	45	-	56	-	89	-	139	-	85	-	48	-
Rainbow smelt	0	0	0	0	0	0	10	80.0	5	76.6	8	100	0	0
Unknown	0	0	0	0	0	0	3	20.0	2	23.4	0	0	0	0
Total fish eggs	0	-	0	-	0	-	13	-	7	-	8	-	0	-
Bryum	-	0	-	6.3	-	6.3	-	4.2	-	0	-	0	-	62.5
Carex	-	0	-	0	-	0	-	4.2	-	0	-	0	-	0
Chara	-	12.5	-	0	-	0	-	4.2	-	0	-	6.3	-	0
Elodea	-	37.5	-	31.3	-	75.0	-	79.2	-	43.8	-	56.3	-	0
Equiseta	-	12.5	-	0	-	0	-	0	-	0	-	0	-	0
Isoetes	-	0	-	0	-	0	-	4.2	-	0	-	0	-	0
Lemna	-	0	-	0	-	6.3	-	0	-	12.5	-	0	-	0
Nitella	-	25.0	-	0	-	6.3	-	50.0	-	81.3	-	75.0	-	37.5
Potomageton	-	75.0	-	43.8	-	37.5	-	70.8	-	50.0	-	68.8	-	62.5
Unidentified	-	62.5	-	62.5	-	62.5	-	66.2	-	37.5	-	31.3	-	75.0
Total macrophytes	-	100	-	68.8	-	93.8	-	100	-	87.5	-	81.3	-	87.5
N		8		16		16		24		16		16		8

similar (2-8) (Table 16). During winter, the most notable trends among major components of the benthic drift were 1.) mysids which were most numerous at stations 1-4, and 2.) Chironomidae and Ephemeroptera were very abundant relative to other stations and the only taxa encountered at station 9.

During summer, benthic drift at stations 1-3 and 8-9 was largely Ephemeroptera (36-63%), with the remaining, more mid-lake stations 4-7 dominated by Chironomidae (51-70%). Remaining major benthic drift components were most abundant at depths ≤3 m.

Even though very high larval fish drift abundances were encountered at station 5 in the central portion of Lake Nicolet (up to 15,600/1000 m^3, see Appendices 87 and 88), average station density estimates for stations 1-8 ranging from 101/1000 m^3 to 347/1000 m^3 were non-significant. However, all estimates of larval fish drift were significantly greater than at station 9 which averaged only 21/1000 m^3.

During winter at Lake Nicolet, macrophytes were most frequently encountered at stations 3 and 4. None or very few plants occurred at stations 2 and 7-9. The dominant plant occurring in Lake Nicolet drift samples was *Nitella*. During summer, macrophytes were collected at stations 1-4 and 6, wherein *Nitella* was dominant at all except station 1 where *Utricularia* occurred in equal frequency with *Nitella* (13%) (Table 16).

Point aux Frenes--

During winter, there were no significant station differences for total benthic drift density, which was largely dominated by Chironomidae. However, during summer, the two stations nearest shore (1 and 7) had significantly greater total benthic drift density (1712/1000 m^3 and 1328/1000 m^3, respectively) than did the navigation channel, station 4 (88/1000 m^3), but were not significantly different from stations 2-3 and 5-6 (206-582/1000 m^3) (Table 17). The drifting benthos at all stations was dominated by Ephemeroptera, Hydracarina, Corixidae, Chironomidae, and Amphipoda. The number of benthic taxa collected at each station was similar (8-11) except at station 7 where 16 taxa were collected.

No fish larvae were collected at stations 1, 2, and 6. Maximum numbers were collected in the drift at stations 4 (37/1000 m^3) and 7 (28/1000 m^3). Drifting fish larvae estimates ranged from 2/1000 m^3 at station 3 to 10/1000 m^3 at station 5. The latter two stations had significantly fewer fish larvae than did station 4, but neither was significantly different from station 7. Density differences between stations 4 and 7 were non-significant.

Table 16. Mean density ($\bar{X}$, no./1000 m³) and percentage of average total density (%)T) for benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence for each station at lower Lake Nicolet during winter and summer periods for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Station mean densities pooled over all depths sampled and time periods within each season. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Lake Nicolet - Winter - 355 um																	
	Stn. 1		Stn. 2		Stn. 3		Stn. 4		Stn. 5		Stn. 6		Stn. 7		Stn. 8		Stn. 9	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	0	0	0	0	1	2.1	3	15.4	-	-	0	0	0	0	0	0	0	0
Naididae	0	0	0	0	0	0	<1	1.2	-	-	0	0	0	0	0	0	0	0
Mysis relicta	61	81.4	8	88.5	12	46.4	6	28.2	-	-	2	30.3	2	17.9	0	0	0	0
Amphipoda	2	2.9	0	0	1	2.3	1	3.4	-	-	0	0	0	0	0	0	0	0
Hydracarina	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0
Ephemeroptera	2	3.2	0	0	0	0	1	3.4	-	-	3	44.0	1	7.7	14	34.2	144	31.6
Corixidae	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0
Trichoptera	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0
Chaoboridae	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0
Chironomidae	9	12.5	1	11.5	12	46.8	10	47.2	-	-	2	25.7	9	74.4	27	65.7	311	68.4
Total benthos w/o Hydra	75	100	10	100	26	97.9	17	84.6	-	-	8	100	12	100	41	100	455	100
Total benthos	75	-	10	-	26	-	20	-	-	-	8	-	12	-	41	-	455	-
No. of taxa		4		2		5		8		-		4		3		4		2
Lemna	-	0	-	0	-	0	-	0	-	-	-	0	-	0	-	0	-	12.5
Nitella	-	0	-	0	-	43.8	-	45.8	-	-	-	16.7	-	0	-	0	-	0
Potomageton	-	0	-	0	-	0	-	20.8	-	-	-	4.2	-	0	-	0	-	0
Typha	-	0	-	0	-	6.3	-	8.3	-	-	-	0	-	0	-	0	-	0
Unidentified	-	37.5	-	12.5	-	0	-	20.8	-	-	-	8.3	-	0	-	0	-	0
Total macrophytes	-	37.5	-	12.5	-	50.0	-	66.7	-	-	-	20.8	-	0	-	0	-	12.5
N		8		16		16		24		-		24		16		16		8

Table 16. Continued.

	Lake Nicolet - Summer - 355 um																	
	Stn. 1		Stn. 2		Stn. 3		Stn. 4		Stn. 5		Stn. 6		Stn. 7		Stn. 8		Stn. 9	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	0	0	6	0.6	13	1.3	49	8.4	0	0	28	8.9	9	1.2	0	0	11	1.9
Naididae	53	5.4	11	1.0	0	0	3	0.5	2	0.8	7	2.2	0	0	0	0	11	1.9
Mysis relicta	0	0	1	0.1	15	1.5	3	0.6	0	0	20	6.5	3	0.4	0	0	0	0
Amphipoda	160	16.4	7	0.7	27	2.7	16	2.7	1	0.5	21	6.6	0	0	2	0.8	0	0
Hydracarina	85	8.7	5	0.5	22	2.2	2	0.4	15	5.8	3	1.0	0	0	17	6.2	32	5.7
Ephemeroptera	351	36.1	655	63.3	439	43.6	123	21.2	18	6.7	28	9.0	170	24.6	146	54.6	333	59.1
Corixidae	0	0	4	0.3	0	0	0	0	9	3.3	0	0	0	0	0	0	0	0
Trichoptera	103	10.6	68	6.5	86	8.6	80	13.8	30	11.4	14	4.4	95	13.7	6	2.2	27	4.8
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	194	19.9	273	26.4	405	40.2	297	51.3	186	70.2	191	60.9	411	59.5	92	34.4	151	26.7
Total benthos w/o Hydra	972	100	1029	99.4	994	98.7	530	91.6	265	100	286	91.1	682	98.8	268	100	554	98.1
Total benthos	972	-	1035	-	1007	-	579	-	265	-	313	-	691	-	268	-	564	-
No. of taxa		11		17		13		23		11		16		10		12		8
Rainbow smelt	16	10.3	556	75.8	725	78.7	383	71.2	3205	92.3	418	75.7	711	79.0	49	48.4	11	50.0
Burbot	0	0	1	0.2	8	0.8	5	0.9	2	0.1	0	0	0	0	0	0	0	0
Lake herring	0	0	0	0	6	0.6	0	0	0	0	0	0	0	0	0	0	0	0
Damaged larvae	136	89.6	176	24.0	183	19.9	151	28.0	264	7.6	134	24.3	189	21.0	52	51.6	11	50.0
Total fish larvae	152	-	733	-	922	-	538	-	3471	-	552	-	900	-	101	-	21	-
Chara	-	0	-	6.3	-	0	-	0	-	0	-	0	-	0	-	0	-	0
Nitella	-	12.5	-	12.5	-	12.5	-	37.5	-	0	-	12.5	-	0	-	0	-	0
Potomageton	-	0	-	0	-	0	-	8.3	-	0	-	8.3	-	0	-	0	-	0
Utricularia	-	12.5	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0
Unidentified	-	12.5	-	12.5	-	25.0	-	20.8	-	6.3	-	25.0	-	18.8	-	6.3	-	25.0
Total macrophytes	-	37.5	-	31.3	-	31.3	-	41.7	-	6.3	-	33.3	-	18.8	-	6.3	-	25.0
N		8		16		16		24		16		24		16		16		8

Table 17 Mean density ($\bar{X}$, no./1000 m^3) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs, and for macrophytes as percent occurrence for each station at Point aux Frenes during winter and summer periods for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Station mean densities pooled over all depths sampled and time periods within each season. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Point aux Frenes - Winter - 355 um													
	Stn. 1		Stn. 2		Stn. 3		Stn. 4		Stn. 5		Stn. 6		Str. 7	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	0	0	0	0	0	0	0	0	-	-	-	-	-	-
Naididae	0	0	0	0	0	0	0	0	-	-	-	-	-	-
Mysis relicta	0	0	0	0	1	3.4	1	8.7	-	-	-	-	-	-
Amphipoda	0	0	1	2.5	3	7.3	1	7.5	-	-	-	-	-	-
Hydracarina	0	0	0	0	1	1.7	1	5.1	-	-	-	-	-	-
Ephemeroptera	0	0	0	0	1	3.4	0	0	-	-	-	-	-	-
Corixidae	0	0	3	14.2	1	3.9	0	0	-	-	-	-	-	-
Trichoptera	0	0	1	4.9	0	0	0	0	-	-	-	-	-	-
Chaoboridae	0	0	0	0	0	0	0	0	-	-	-	-	-	-
Chironomidae	23	100	18	78.4	28	80.4	8	76.2	-	-	-	-	-	-
Total benthos w/o *Hydra*	23	100	23	100	35	100	10	100	-	-	-	-	-	-
Total benthos	23	-	23	-	35	-	10	-	-	-	-	-	-	-
No. of taxa		1		4		7		5		-		-		-
Lemna	-	0	-	25.0	-	18.8	-	25.2	-	-	-	-	-	-
Nitella	-	0	-	31.3	-	50.0	-	25.0	-	-	-	-	-	-
Potomageton	-	0	-	6.3	-	0	-	0	-	-	-	-	-	-
Unidentified	-	0	-	12.5	-	18.8	-	12.5	-	-	-	-	-	-
Total macrophytes	-	0	-	43.8	-	62.5	-	37.5	-	-	-	-	-	-
N		8		16		16		24		-		-		-

Table 17. Continued.

Taxon	Stn. 1 $\bar{X}$	Stn. 1 %T	Stn. 2 $\bar{X}$	Stn. 2 %T	Stn. 3 $\bar{X}$	Stn. 3 %T	Stn. 4 $\bar{X}$	Stn. 4 %T	Stn. 5 $\bar{X}$	Stn. 5 %T	Stn. 6 $\bar{X}$	Stn. 6 %T	Stn. 7 $\bar{X}$	Stn. 7 %T
	Point aux Frenes - Summer - 355 um													
Hydra	7	0.4	0	0	0	0	1	1.3	0	0	4	0.8	0	0
Naididae	12	0.7	3	0.2	8	2.3	0	0	25	11.9	38	8.5	210	15.8
Mysis relicta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Amphipoda	68	4.0	54	3.1	37	10.2	24	27.4	27	13.3	45	9.9	76	5.7
Hydracarina	514	29.9	346	20.1	141	38.3	19	21.5	20	9.7	54	12.0	98	7.4
Ephemeroptera	286	16.6	55	3.2	51	14.0	5	5.3	75	36.3	163	36.3	234	17.7
Corixidae	181	10.5	2	0.1	2	0.6	2	1.8	10	4.7	88	19.6	288	21.7
Trichoptera	352	20.5	26	1.5	29	7.9	8	8.5	0	0	11	2.5	7	0.6
Chaoboridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae	298	17.4	97	5.7	96	26.1	30	34.2	38	18.6	47	10.4	307	23.1
Total benthos w/o *Hydra*	1712	99.6	582	100	367	100	88	98.7	206	100	445	99.2	1328	100
Total benthos	1718	-	582	-	367	-	89	-	206	-	449	-	1328	-
No. of taxa		11		9		10		8		9		11		16
Rainbow smelt	0	0	0	0	0	0	27	72.4	5	50.0	0	0	0	0
Damaged larvae	0	0	0	0	2	100	10	27.6	5	50.0	0	0	28	100
Total fish larvae	0	-	0	-	2	-	37	-	10	-	0	-	28	-
Chara	-	12.5	-	0	-	6.3	-	0	-	6.3	-	0	-	12.5
Lemna	-	0	-	6.3	-	0	-	0	-	6.3	-	0	-	0
Nitella	-	37.5	-	6.3	-	6.3	-	29.2	-	37.5	-	25.0	-	75.0
Potomageton	-	12.5	-	0	-	6.3	-	0	-	6.3	-	0	-	12.5
Utricularia	-	0	-	0	-	0	-	0	-	0	-	6.3	-	0
Unidentified	-	25.0	-	18.8	-	25.0	-	37.5	-	50.0	-	56.3	-	62.5
Total macrophytes	-	50.0	-	25.0	-	25.0	-	45.8	-	68.8	-	62.5	-	87.5
N		8		16		16		24		16		16		8

Nitella and *Lemna* were the most frequently occurring macrophytes at stations 2-4 during winter at Point aux Frenes. No plants were collected at station 1. During summer, plants were collected in greatest frequency at stations 7-9. However, regardless of how frequently macrophytes were encountered at each station, *Nitella* occurred most often or shared equal dominance with other plants at all stations.

Weather Effects on Drift Densities

Lake Nicolet--

During the two summer day-periods at Lake Nicolet, two very different weather conditions were encountered. On Day 1 (6 June 1985) at stations 1-4, weather conditions changed from a short period of calm winds and rain to sunny and windy resulting in 0.3-0.6-m waves. On Day 2 (7 June 1985), the river in the vicinity of stations 1-4 had no waves and was essentially calm. Day 1 current velocities at the shallower stations (1-3) averaged 27 cm/s and were considerably greater than those measured on Day 2 under calm conditions (8 cm/s). Little variation in current velocity was noted at station 4 (21 vs. 20 cm/s). No ships passed downbound on the windy day, however, the Canadian Olympic and the Kupa passed downbound on the calm day while nets were set at station 1.

Based on estimates pooled over stations 1-4, samples from the windy day had significantly greater numbers of Chironomidae (42/1000 m^3 vs. 19/1000 m^3) and total benthic drift (78/1000 m^3 vs. 41/1000 m^3) when compared with samples from the calm day (Table 18). While no significant density differences were noted for other major benthic drift components or for total fish larval drift, for nearly all, greatest densities occurred on the windy day.

Point aux Frenes--

A similar event occurred at Point aux Frenes. On Day 1 (11 June 1985) wave height was 0.3 m to 0.6 m at stations 1-3, but on Day 2 (12 June 1985) it was reduced to <0.3 m. Only the comparison for Chironomidae was significant, with greater densities observed on the windy day (29/1000 m^3) when compared with the calm day (7/1000 m^3). However, in many comparisons, though non-significant, drift densities were greatest on the windy day (Table 18). No fish larvae were collected at stations 1-3 during the day.

Table 18. Mean density ($\bar{X}$, no./1000 m^3) and percentage of average total density (%T) for benthos, fish larvae, and fish eggs pooled over stations 1-4 at Lake Nicolet and over stations 1-3 at Point aux Frenes during the summer under conditions of calm and windy weather for components of the drift collected with 355-um mesh nets in the St. Marys River, 1985. Included at the end of %T column are the number of benthic taxa and the number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Lake Nicolet				Pt. aux Frenes			
	Calm		Windy		Calm		Windy	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
<u>Hydra</u>	8	15.6	48	38.0	0	0	5	4.8
Naididae	0	0	16	13.0	5	7.0	3	2.4
<u>Mysis relicta</u>	0	0	1	1.2	0	0	0	0
Amphipoda	3	5.4	6	4.4	0	0	0	0
Hydracarina	5	10.6	4	2.9	38	54.4	63	58.3
Ephemeroptera	3	5.3	0	0	0	0	3	2.4
Corixidae	0	0	0	0	15	21.1	3	2.7
Trichoptera	9	18.8	3	2.0	5	7.0	3	2.4
Chaoboridae	0	0	0	0	0	0	0	0
Chironomidae	19	39.0	42	33.8	7	10.5	29	26.9
Total benthos w/o <u>Hydra</u>	41	84.4	78	62.0	69	100	102	95.1
Total benthos	48	-	125	-	69	-	108	-
No. of taxa		8		10		5		7
Rainbow smelt	227	75.3	253	77.5	0	0	0	0
Burbot	0	0	11	3.2	0	0	0	0
Damaged larvae	74	24.7	63	19.3	0	0	0	0
Total fish larvae	301	-	327	-	0	-	0	-
N		16		16		10		10

Frechette Point--

Weather comparisons at Frechette Point were confounded by diel differences, because weather conditions on Days 1 and 2 were windy (0.3- to 0.6-m waves), while night weather conditions were calm with no waves. As previously noted total benthic drift density estimates pooled over all stations indicated the windy day densities (2488/1000 m^3) significantly exceeded calm night densities (750/1000 m^3) by a factor of 3.32. The number of fish larvae caught during the day (88/1000 m^3) exceeded, but not significantly, the number retained at night (67/1000 m^3) by a factor of 1.31. Additionally, the tug, Canonie, and a barge it was guiding passed upbound during the day. At night the Roger M. Keys, Belle River, St. Clair, and Fred E. White Jr. passed downbound while a variety of station nets were set. Regardless of ship passage, daytime densities for both benthos and fish larvae were greater than night densities.

Ship Passage Drift Studies

Introduction--

Upbound and downbound ship passage studies were conducted on June 10, 1985 during daylight. Weather for both studies was sunny and windy. Wave height at Frechette Point was 0.3 m to 1.0 m, with wind speeds ranging from 26 km/h to 44 km/h. The upbound portion of the study was based on the 1031 EDT passage of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m). The speed of the Comeaudoc was 13.2 km/h. The downbound portion of the study was based on the 1437 EDT passage of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m). The speed of the V.W. Scully was 13.5 km/h. The passage of both vessels was within 150 m of station 3 (3 m) where 153-μm nets were set to collect drift in five approximate 5-min periods corresponding to before-, during-, after 1- (+5 min), after 2- (+10 min), and after 3-(+15 min) ship passage periods.

Passage of the upbound ship had a much greater visible effect on the physical appearance of the sampling device than did the downbound vessel. When placed in the water with nets attached, the main support rod of the sample device was normally deflected 10-15° from the vertical at Frechette Point. However, during the 2-min period when the Comeaudoc passed nearest the nets, the main support rod was displaced 20-25° from vertical. Additionally, mid-depth current velocity increased from 41-43 cm/s to 54-56 cm/s. In the following minute, current velocity decreased to 44 cm/s, and the main support rod returned to its normal deflection in the current.

With passage of the downbound vessel, there was no observable deflection of the main support rod from its normal position in the 8 min representing the During ship passage period. During this 8-min period, in the 5 min prior to the V.W. Scully's passage, mid-depth current velocity ranged from 46 cm/s to 54 cm/s. However, in the 2-min period during which the vessel passed closest to the nets, current velocity decreased to 43 cm/s and 41 cm/s, respectively. In the ensuing minute just after immediate passage, current velocity decreased further to 40 cm/s.

Estimates of downbound benthic and ichthyoplankton drift catches required correction, because at least one of the two replicate nets located at the bottom during the second 5-min period after passage (After 2) of the downbound V.W. Scully apparently tangled around a portion of the sample device and did not sample properly. As one replicate had no benthos and another had only a low number relative to the mid-depth net catch, estimates of the drift near bottom in the After 2 period were not considered in statistical comparisons. However, estimates from these two nets do appear in density averages in tables where they may be part of a pooled average (Tables 20 and 29).

Comparisons of Upbound and Downbound Pooled Drift--

When comparing upbound (N = 20) and downbound (N = 18) mean drift density pooled over all respective samples, drift was significantly greater for Naididae (4623/1000 m^3 vs. 1292/1000 m^3), Chironomidae (2329/1000 m^3 vs. 1536/1000 m^3), and total benthic drift (9608/1000 m^3 vs. 5416/1000 m^3) in upbound samples (Tables 19-20). Upbound and downbound density estimates for all other major components of the benthic drift and for larval fish drift were statistically non-significant. While *Hydra*, Naididae, and Chironomidae were the dominant benthic taxa in all cases, Naididae was the most numerous of the 53 benthic taxa (Table 1) collected in the upbound vessel study (48% of total benthic drift), and *Hydra* was predominant among the 11 taxa collected in the downbound vessel study (45%). In both studies, rainbow smelt were the dominant fish larvae, making up >90% of total fish larvae. The only other larval fish encountered was burbot which made up <3% of total fish larvae.

Comparisons of Mid-depth and Bottom Pooled Drift in the Upbound Study--

All comparisons of benthic drift densities pooled over mid-depth and bottom depth strata (N = 10) in the upbound vessel study were non-significant except for Naididae. Naidid drift density was significantly greater at bottom (6319/1000 m^3) than

Table 19. Percent occurrence of 10 ten most frequently collected taxa in winter, summer, and winter and summer combined in 355-um mesh drift net samples in the St. Marys River, 1985. Also included are percent occurrences for the 10 most frequently occurring taxa in the benthic 1982-1983 study of Liston et al. (1985).

Benthic study Liston et al. (1985)		Winter + summer drift study combined		Summer drift study		Winter drift study	
Chironomidae	100	Chironomidae	66	Chironomidae	79	Chironomidae	51
Oligochaeta	99.5	*Hydra*	31	Ephemeroptera	44	*Hydra*	26
Ceratopogonidae	72	Ephemeroptera	30	Trichoptera	40	Mysis relicta	20
Hexagenia	61	Oligochaeta	26	Oligochaeta	36	Oligochaeta	15
Ephemera	45	Naididae	25	*Hydra*	35	Naididae	15
Caenis	36	Trichoptera	23	Naididae	34	Ephemeroptera	14
Polycentropus	34	Hydracarina	18	Hydracarina	32	Remaining	<3
Polychaeta	34	*Oecetis*	17	*Oecetis*	32		
Oecetis	28	*Hexagenia*	16	*Hexagenia*	27		
Mystacides	25	*Mysis relicta*	16	*Hyalella azteca*	22		

Table 20. Comparisons of benthic and ichthyoplankton drift catches over the entire sampling period of the upbound passage of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

	Upbound					
	Mid-depth		Bottom depth		All depths	
Taxon	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	2432	31.9	2346	20.3	2389	24.9
Naididae	2926	38.3	6319	54.6	4623	48.1
Ephemeroptera	15	0.2	28	0.2	21	0.2
Trichoptera	38	0.5	35	0.3	37	0.4
Chironomidae	2055	26.9	2603	22.5	2329	24.2
Total benthos	7634	-	11581	-	9608	-
No. of taxa		11		11		13
Rainbow smelt	578	93.8	296	94.4	437	94.0
Burbot	24	3.8	0	0	12	2.5
Damaged	15	2.4	18	5.6	16	3.5
Total fish larvae	617	-	213	-	465	-
N		10		10		20

at mid-depth (2926/1000 m^3). Total larval fish drift density was significantly higher at mid-depth (617/1000 m^3) when compared with bottom (313/1000 m^3).

Comparisons of Mid-depth and Bottom Pooled Drift in the Downbound Study--

When pooled in a manner the same as for the upbound vessel study, there were no statistically significant drift density differences between mid- (N = 10) and bottom (N = 8) depth strata for major benthic components of the drift. However, as in the upbound vessel study, total larval fish drift density was significantly greater at mid-depth (578/1000 m^3) when compared with the bottom strata (184/1000 m^3).

Comparisons of the Five Ship Passage Periods at Each Depth Stratum and Combined Depth Strata for Respective Upbound and Downbound Studies--

The only significant density difference among either upbound or downbound ship passage periods at mid-depth (N = 2), bottom (N = 2), and for both strata combined (N = 4) was for total larval fish drift density at mid-depth in the upbound vessel study. In this comparison, total larval fish drift density in the After 1 period (369/1000 m^3) was significantly lower than in all remaining periods for which density differences were non-significant (517-1108/1000 m^3) (Tables 21-25).

While density trends between depth strata and between the two studies were apparent, there were no clear trends from one 5-min period to another within upbound or downbound vessel studies. Total benthic drift density in the upbound vessel study was consistently greater near bottom when compared with mid-depth at all sample periods except the After 3 period. However, in the downbound study, most mid-depth density estimates of the benthos were greater than bottom estimates. When pooling data from both depth strata, the total benthic drift density estimates during the upbound vessel passage exceeded downbound estimates during all 5-min sampling periods. When examining benthic drift density trends successively across the five sample periods, there was no consistent trend at any combination of depth strata in either study (Tables 21-25).

Similar comparisons of total larval fish drift density for upbound and downbound vessel studies indicated mid-depth densities exceeded bottom estimates during each 5-min sampling period. When pooling data from both depth strata, total larval fish drift density in the downbound vessel study was similar during all 5-min periods (Tables 26-30). During the upbound

Table 21. Comparisons of benthic and ichthyoplankton drift catches over the entire sampling period of the downbound passage of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	2728	50.7	1817	39.3	2273	45.4
Naididae	1114	20.7	1344	29.1	1229	24.6
Ephemeroptera	21	0.4	36	0.8	29	0.6
Trichoptera	23	0.4	24	0.5	23	0.5
Chironomidae	1456	27.1	1333	28.8	1395	27.9
Total benthos	5380	-	4623	-	5001	-
No. of taxa		8		9		11
Rainbow smelt	568	98.2	160	100	364	98.6
Burbot	11	1.8	0	0	5	1.4
Damaged	0	0	0	0	0	0
Total fish larvae	578	-	160	-	369	-
N		10		10		20

Table 22. Comparisons of benthic and ichthyoplankton drift catches prior to the upbound passage (Before) of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Upbound - Before ship passage					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	1625	17.7	2289	20.3	1957	19.2
Naididae	5244	57.3	6778	60.2	6011	58.9
Ephemeroptera	0	0	0	0	0	0
Trichoptera	74	0.8	0	0	37	0.4
Chironomidae	2216	24.2	1937	17.2	2076	20.3
Total benthos	9158	-	11268	-	10213	-
No. of taxa		4		6		7
Rainbow smelt	517	100	352	100	435	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	517	-	352	-	435	-
N		2		2		4

Table 23. Comparisons of benthic and ichthyoplankton drift catches during the upbound passage (During) of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Upbound - During ship passage					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	2116	39.3	3102	16.3	2609	21.3
Naididae	1411	26.2	12934	67.8	7172	58.6
Ephemeroptera	0	0	53	0.3	26	0.2
Trichoptera	44	0.8	0	0	22	0.2
Chironomidae	1631	30.3	2892	15.2	2262	18.5
Total benthos	5379	-	19085	-	12232	-
No. of taxa		7		6		8
Rainbow smelt	529	92.3	158	100	343	94.0
Burbot	44	7.7	0	0	22	6.0
Damaged	0	0	0	0	0	0
Total fish larvae	573	-	158	-	365	-
N		2		2		4

Table 24. Comparisons of benthic and ichthyoplankton drift catches in the first 5-min period after the upbound passage (After 1) of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Upbound - After ship passage (1)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	1625	26.7	1320	15.8	1473	20.3
Naididae	1994	32.5	2817	33.7	2406	33.2
Ephemeroptera	0	0	88	1.1	44	0.6
Trichoptera	0	0	176	2.1	88	1.2
Chironomidae	2216	36.1	3433	41.1	2824	39.0
Total benthos	6130	-	8363	-	7246	-
No. of taxa		6		7		9
Rainbow smelt	369	100	88	100	229	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	369	-	88	-	229	-
N		2		2		4

AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86 2/4

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL

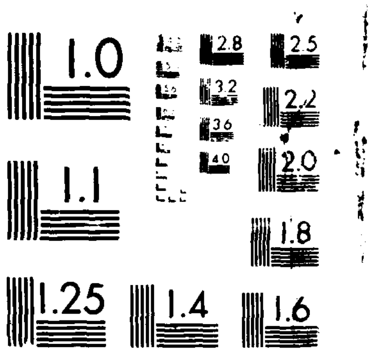

1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

Table 25. Comparisons of benthic and ichthyoplankton drift catches in the second 5-min period after the upbound passage (After 2) of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. *Included at the end of* %T *column are the number of benthic taxa and number of* samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Upbound - After ship passage (2)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	2585	36.8	3961	29.8	3273	32.2
Naididae	2216	31.6	6250	47.0	4233	41.7
Ephemeroptera	74	1.1	0	0	37	0.4
Trichoptera	74	1.1	0	0	37	0.4
Chironomidae	1846	26.3	2993	22.5	2420	23.8
Total benthos	7016	-	13292	-	10154	-
No. of taxa		6		4		7
Rainbow smelt	1034	93.3	528	85.7	781	90.6
Burbot	74	6.7	0	0	37	4.3
Damaged	0	0	88	14.3	44	5.1
Total fish larvae	1108	-	616	-	862	-
N		2		2		4

vessel passage, following was a decline from 435/1000 m^3 (Before) to 229/1000 m^3 (After 1), there was a sharp increase in larval fish drift density during the After 2 period to 862/1000 m^3 (Tables 21-24). Larval fish drift density returned to the level estimated during the Before period during the After 3 period (435/1000 m^3). This trend occurred at both depth strata.

ZOOPLANKTON

Zooplankton Abundance and Community Structure

Winter--

Zooplankton abundances, as determined by #2-mesh net collections, were extremely low during the winter study period (late February to early March, 1985) averaging 313.2/m^3 ±228.9/m^3 at Frechette Point, 376.3/m^3 ±206.6/m^3 at Lake Nicolet, and 187.3/m^3 ±151.5/m^3 at Lake Munuscong (Table 31). Differences in zooplankton abundances among the three locations were statistically significant ($p = 0.05$; Kruskal-Wallis test). Mean current velocity decreased along the course of the river averaging 25.8 cm/sec at Frechette Point, 18.9 cm/sec at Lake Nicolet, and 4.0 cm/sec at Lake Munuscong; such differences also were statistically significant ($p = 0.05$; Kruskal-Wallis test).

The zooplankton community was dominated by adult *Diaptomus sicilis* (mean individual dry weight 10.4 μg) and by adult *Limnocalanus macrurus* (mean individual dry weight of 37.6 μg). Nauplii, immature copepodites, and cladocerans were extremely rare. There was no difference in the average individual dry weight of zooplankton at the three locations during winter; average individual dry weight ranged from 10.8 μg at Lake Nicolet to 11.0 μg at Frechette Point and Lake Munuscong.

Zooplankton distributions were not uniform in the water column. Abundances (based on #2-mesh net collections) were significantly different ($p = 0.05$; Mann-Whitney U-test) between channel stations and shallower stations (Table 32). In all instances, zooplankton densities were greater in the more rapidly flowing and deeper channel stations than in more shallow waters. There was no apparent difference in mean zooplankton size between shallow and channel stations (11.2 μg versus 10.8 μg at Frechette Point; 10.8 μg versus 10.8 μg at Lake Nicolet; 10.6 versus 11.0 μg at Lake Munuscong). This suggests that while zooplankton abundances varied between channel and shallow stations, community structure did not. Current velocities (Table 32) were significantly ($p = 0.05$; Mann-Whitney U-test) higher at channel stations than at shallow stations.

Table 26. Comparisons of benthic and ichthyoplankton drift catches in the third 5-min period after the upbound passage (After 3) of the Comeaudoc (length = 223 m, width = 23 m, draft = 4.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. *Percentages based on five significant figures and rounded to nearest tenth.* Column summations subject to round-off errors.

Taxon	Upbound - After ship passage (3)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
<u>Hydra</u>	4210	40.1	1056	17.9	2633	32.1
Naididae	3767	35.9	2817	47.8	3292	40.2
Ephemeroptera	0	0	0	0	0	0
Trichoptera	0	0	0	0	0	0
Chironomidae	2363	22.5	1761	29.9	2062	25.2
Total benthos	10487	-	5898	-	8193	-
No. of taxa		4		5		5
Rainbow smelt	443	85.7	352	100	398	91.5
Burbot	0	0	0	0	0	0
Damaged	74	14.3	0	0	37	8.5
Total fish larvae	517	-	352	-	435	-
N		2		2		4

Table 27. Comparisons of benthic and ichthyoplankton drift catches prior to the downbound passage (Before) of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m³) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound - Before ship passage					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	3362	51.2	1689	38.4	2525	46.1
Naididae	1863	28.5	1086	24.7	1477	26.9
Ephemeroptera	53	0.8	0	0	27	0.5
Trichoptera	53	0.8	60	1.4	57	1.0
Chironomidae	1174	17.9	1568	35.6	1371	25.0
Total benthos	6564	-	4403	-	5483	-
No. of taxa		6		4		6
Rainbow smelt	694	100	302	100	498	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	694	-	302	-	498	-
N		2		2		4

Table 28. Comparisons of benthic and ichthyoplankton drift catches during the downbound passage (During) of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound - During ship passage					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	1153	34.8	703	24.1	928	29.8
Naididae	1035	31.3	870	29.9	953	30.6
Ephemeroptera	0	0	0	0	0	0
Trichoptera	59	1.8	0	0	29	1.0
Chironomidae	1035	31.3	1238	42.5	1137	36.5
Total benthos	3312	-	2912	-	3112	-
No. of taxa		5		5		7
Rainbow smelt	651	100	134	100	392	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	651	-	134	-	392	-
N		2		2		4

Table 29. Comparisons of benthic and ichthyoplankton drift catches in the first 5-min period after the downbound passage (After 1) of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound - After ship passage (1)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	1014	33.9	3498	45.7	2256	42.4
Naididae	640	21.4	2111	27.6	1376	25.8
Ephemeroptera	53	1.8	60	0.8	57	1.1
Trichoptera	0	0	0	0	0	0
Chironomidae	1281	42.9	1930	25.2	1605	30.2
Total benthos	2988	-	7660	-	5324	-
No. of taxa		4		5		6
Rainbow smelt	427	88.9	121	100	274	91.1
Burbot	53	11.1	0	0	27	8.9
Damaged	0	0	0	0	0	0
Total fish larvae	480	-	121	-	300	-
N		2		2		4

Table 30. Comparisons of benthic and ichthyoplankton drift catches in the second 5-min period after the downbound passage (After 2) of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m^3) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound - After ship passage (2)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	4056	58.9	422	33.3	2239	54.8
Naididae	1281	18.6	663	52.4	972	23.9
Ephemeroptera	0	0	0	0	0	0
Trichoptera	0	0	0	0	0	0
Chironomidae	1548	22.5	121	9.5	834	20.5
Total benthos	6884	-	1267	-	4075	-
No. of taxa		3		4		4
Rainbow smelt	640	100	60	100	350	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	640	-	60	-	350	-
N		2		2		4

Zooplankton abundances in #2-mesh net collections varied significantly among depth strata (i.e. surface, mid-depth, and bottom collections) at the three locations. Overall, there was a strong tendency for zooplankton abundances to decrease with depth strata; current velocity also decreased with depth strata (Table 3). At Frechette Point, mean abundances decreased from 750.3/m³ in surface samples, to 316.6/m³ in mid-depth samples, to 248.2/m³ in bottom samples. These differences were statistically significant ($p = 0.05$; Kruskal-Wallis test) as were differences in zooplankton abundances between mid-depth and bottom samples ($p = 0.05$; Mann-Whitney U-test). The decrease in current velocity with depth also was statistically significant for three depth (surface, mid-depth, and bottom) and two depth (mid-depth and bottom) strata comparisons. At Lake Nicolet, decreases in zooplankton abundance and current velocity with depth strata were statistically significant for three-depth and two-depth comparisons. At Lake Munuscong, zooplankton abundances varied significantly with depth strata both for two-depth and three-depth comparisons. Differences in current velocity with depth strata were significant only for the three-depth comparisons. There was no apparent difference in the mean individual size of zooplankton collected from the three depth strata at Frechette Point (10.7 µg, 11.2 µg, and 11.1 µg), Lake Nicolet (10.8 µg, 10.9 µg, and 10.7 µg), and Lake Munuscong (10.9 µg, 11.0 µg, and 10.9 µg). This suggests that there were only minor changes in zooplankton community structure with depth strata.

Zooplankton did not exhibit significant ($p = 0.05$; Mann Whitney U-test) variations in abundance between day and night #2-mesh net collections (Table 34) at any of the three locations. Mean animal size also was similar during day and night collections at Frechette Point (10.9 µg and 11.2 µg), Lake Nicolet (10.9 µg and 10.8 µg), and Lake Munuscong (11.0 µg and 11.0 µg) suggesting that zooplankton community structure was similar in day and night collections. Differences in current velocities (Table 34) between day and night collections were not statistically significant.

Finally, zooplankton abundances were compared in matched #10-mesh and #2-mesh net collections. Zooplankton abundances were significantly ($p = 0.05$; Mann-Whitney U-test) higher in #10-mesh than #2-mesh net collections at Frechette Point (956.2/m³ versus 326.6/m³) and Lake Nicolet (769.1/m³ versus 403.9/m³). However, such differences were not statistically significant at Lake Munuscong (183.0/m³ versus 210.3/m³). The mean size of zooplankton collected by the #10-mesh net tended to be smaller than for #2-mesh net collections averaging respectively 9.3 µg and 10.7 µg at Frechette Point, 9.3 µg and 10.8 µg at Lake Nicolet, and 8.0 µg and 11.2 µg at Lake Munuscong.

Table 31. Mean zooplankton abundance and standard deviation (SD) at Frechette Point, Lake Nicolet, and Lake Munuscong (Point aux Frenes), February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections.

	Frechette Point		Lake Nicolet		Lake Munuscong	
	#/m^3	SD	#m/^{3}	SD	#m/^{3}	SD
Feb-Mar	313.8	228.9	376.3	206.6	187.3	151.5
Jun	172.2	119.6	89.4	113.9	21.1	49.0

Table 32. Mean zooplankton abundance (#/m^3), current velocity (cm/sec), and weather conditions at channel and shallow stations at Frechette Point, Lake Nicolet, and Lake Munuscong (Point aux Frenes), February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. Weather conditions: 1 = calm, 2 = windy, 3 = very windy.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Parameter	Shallow	Channel	Shallow	Channel	Shallow	Channel
Feb-Mar						
Zooplankton	264.0	476.8	321.1	468.3	152.5	245.2
Current	20.5	43.5	13.8	27.3	2.8	6.0
Weather	-	-	-	-	-	-
Jun						
Zooplankton	149.5	247.7	87.3	93.7	25.4	6.7
Current	29.6	49.3	11.0	19.4	14.8	24.9
Weather	1.5	1.0	1.5	1.1	2.1	2.0

Table 33. Mean zooplankton abundance (#/m^3) by depth strata and average current velocity (cm/sec) at Frechette Point, Lake Nicolet, and Lake Munuscong (Point aux Frenes), February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections.

	Surface		Mid-Depth		Bottom	
Parameter	Zooplankton	Channel	Zooplankton	Channel	Zooplankton	Channel
Feb-Mar						
Frechette Pt.	750.3	40.0	316.6	28.9	248.2	21.5
Lk. Nicolet	611.3	24.6	423.8	20.7	281.9	16.1
Lk. Munuscong	204.8	5.7	253.9	4.3	133.0	3.3
Jun						
Frechette Pt.	238.6	52.2	197.7	36.4	144.4	29.9
Lk. Nicolet	116.0	20.7	129.4	14.8	52.4	11.6
Lk. Munuscong	5.9	26.2	14.2	17.3	28.2	15.2

Spring--

The second sampling period was in early June. Zooplankton abundances as determined by #2-mesh net collections (Table 31) were significantly lower ($p = 0.05$; Mann-Whitney U-test) at each of the three stations during this sampling period than in February. Abundances in June averaged 172.2/m^3 at Frechette Point, 89.4/m^3 at Lake Nicolet, and 21.1/m^3 at Lake Munuscong. Differences in zooplankton abundance between the three locations also were statistically significant ($p = 0.05$; Kruskal-Wallis test). Average flow velocity decreased from Frechette Point (34.2 cm/sec) to Lake Nicolet (13.9 cm/sec) and then increased at Lake Munuscong (17.1 cm/sec). Differences in flow velocity also were statistically significant ($p = 0.05$; Kruskal-Wallis test) among the three stations.

The zooplankton community was more diverse in early June than in February. At Frechette Point and Lake Nicolet, adult *Diaptomus sicilis* (mean individual dry weight of 12.6 µg) continued to be a species dominant. Immature *Limnocalanus macrurus* copepodites (mean individual dry weight of 11.4 µg) also were abundant at these two stations. Other abundant taxa included nauplii, immature *Cyclops* (mean individual dry weight of 1.7 µg) and *Diaptomus* spp. (0.9 µg) copepodites. Immature *Cyclops* spp. copepodites generally were the numerically dominant taxon at Lake Munuscong. *Mesocyclops* sp. and cladocerans such as *Daphnia*, *Bosmina longirostris*, and *Eubosmina coregoni* also were abundant at some stations. Small numbers of the *Daphnia* morph, *D. minnehaha*, were present at station 3 at Frechette Point. It probably entered the site from a local stream or small river rather than from Lake Superior; the morph has not been recorded from the Great Lakes. Small numbers of epibenthic species were present in the various collections suggesting that the littoral zooplankton community was well developed. Mean individual zooplankton dry weight averaged 11.9 µg at Frechette Point, 11.7 µg at Lake Nicolet, but only 1.9 µg at Lake Munuscong. Thus, zooplankton were not only less abundant at Lake Munuscong than at the two upriver stations, but were smaller. This suggests that the downriver decrease in zooplankton abundance was most strongly associated with the larger-bodied taxa.

As in winter, differences in zooplankton abundance (based on #2-mesh net collections) between channel and shallow stations were significant ($p = 0.05$; Mann-Whitney U-test). At Frechette Point and Lake Nicolet, zooplankton were more abundant at channel stations than at stations located in more nearshore, shallow regions (Table 32). There was no apparent difference in mean animal size between channel and shallow stations both at Frechette Point (12.1 µg and 11.9 µg) and Lake Nicolet (11.7 µg and 11.7 µg); this suggests that zooplankton community structure was similar in channel and shallow areas. Current velocities

were significantly higher at channel stations than shallow stations (Table 32). At Lake Munuscong, abundances were significantly greater in shallow (25.4/m³) than channel (6.7/m³) stations. Furthermore, zooplankton tended to be smaller at shallow stations (1.7 μg) than in the channel (4.0 μg). This suggests that there were large differences in zooplankton community structure between shallow and channel stations. As at the other two upriver locations, current velocity was significantly higher in the channel than in the shallow regions of the river.

Differences in zooplankton abundances (#2-mesh net collections) with sample depth were significantly different (p = 0.05; Kruskal-Wallis test for surface, mid-depth, and bottom comparisons; Mann-Whitney U-test for mid-depth versus bottom comparisons). At Frechette Point, mean abundances decreased with sample depth as did current velocities (Table 33); differences were statistically significant for all comparisons. There was little change in mean zooplankton size with increasing depth strata (12.3 μg, 11.9 μg,and 11.9 μg, respectively). Differences in zooplankton abundance and current velocity with depth strata were statistically significant for all comparisons at Lake Nicolet; lowest zooplankton abundances and current velocities were observed near the river bottom. Mean zooplankton size showed little change with increasing depth strata (from 11.7 μg to 11.9 μg to 11.1 μg). Differences in zooplankton abundance with depth strata were not statistically significant at Lake Munuscong; differences in current velocity were significant among the three depth strata but not for mid-depth versus bottom comparisons. There was a strong trend for mean zooplankton size to decrease with depth strata, i.e. from 4.7 μg to 2.2 μg to 1.7 μg.

In contrast to winter, zooplankton exhibited significant (p = 0.05; Mann Whitney U-test) differences in abundance with sampling time based on #2-mesh net collections. At Frechette Point, zooplankton were more abundant in day (228.4/m³) than night (118.1/m³) collections (Table 33). Greater abundances during daylight hours were not anticipated. Mean animal size was 12.0 μg during day collections and 11.9 μg during night collections suggesting that there were little diel changes in zooplankton community structure. Diel differences in zooplankton abundance may have been related to the higher current flow (38.4 cm/sec versus 30.1 cm/sec) and generally more windy conditions (2.0 versus 1.0) associated with day versus night collections (Table 4); these differences were statistically significant. Similarly, zooplankton were significantly more abundant in day (421.1/m³) than night (331.6/m³) collections made at Lake Nicolet (Table 34); mean animal size averaged 11.7 μg during day and night collections. Again, average current flow was significantly higher during day (15.5 cm/sec) than night collections (12.2 cm/

sec); the weather was also significantly more windy during day collections (weather conditions of 1.3 and 1.0 respectively for day and night sampling). Only at Lake Munuscong, where the zooplankton community was dominated by small taxa, were zooplankton significantly more abundant in night (39.1/m^3) than day (3.1/m^3) collections (Table 34). Animals tended to be smaller in night collections averaging 1.7 μg versus 4.0 μg during the day. Although the average current flow was significantly higher during day (18.9 cm/sec) than night (15.4 cm/sec) collections (Table 34), there was no significant difference in weather conditions. The weather was windy to very windy during the day (average weather condition of 2.2) and was windy (average weather condition of 2.0) at night.

Zooplankton densities were significantly (Mann Whitney U-test) more abundant in #10-mesh net collections than in #2-mesh net collections, averaging respectively 541.6/m^3 and 240.7/m^3 at Frechette Point, 283.7/m^3 and 72.8/m^3 at Lake Nicolet, and 438.7/m^3 and 8.8/m^3 at Lake Munuscong (Table 35). At Frechette Point, where there was only a 2.3-fold difference in zooplankton abundance between the two collection methods, the mean size of animals was large averaging 12.1 μg for the #2-mesh net and 7.0 μg for the #10-mesh net. However, at Lake Munuscong, where there was a 50-fold difference in abundance estimates between the two nets, zooplankton were considerably smaller, averaging only 2.6 μg in the #2-mesh-net collections and 1.3 μg in the #10-mesh net.

Biomass Studies

Overview--

The general purpose of the biomass investigations was to characterize the drift or load of particulates carried by the St. Marys River. Load was estimated in terms of dry weight and ash-free weight. Dry weight and ash-free weight were estimated by direct weighing of the appropriate samples (seston, plants, benthos, mysids) or from estimates based on taxa abundance and separately determined dry weights of selected individuals (zooplankton and fish). An average ash-free weight conversion factor of 0.047 (determined in the laboratory) was used for fish and a factor of 0.045 (the mean value determined for mysids in the laboratory) was used for zooplankton. Detritus dry-weight was estimated by subtracting estimated zooplankton dry weight from seston dry weight. Although this estimate generally was good, some negative values were calculated. This sampling error occurred when the seston was strongly dominated by zooplankton. Since different subsamples were used for zooplankton abundance estimates and seston determinations, small variations in subsample weights resulted in some negative detritus dry-weight

estimates. These sampling errors were further magnified when detritus ash-free weight was estimated.

In the following paragraphs, biomass data are presented as dry weight for zooplankton, plants, benthos (including mysids), seston, and detritus. The percentage of dry weight that was ash-free weight is also given for seston (%AFW:seston). Ash-free weights are not presented for other components of the river load because a constant conversion factor was used for zooplankton (a dominant component of river load) and fish, and because the detritus ash-free estimates were not sufficiently accurate to warrant discussion.

General Concentration and Composition of River Load--

The average load carried by the St. Marys River was 5,406.6 mg/1,000 m^3 in February and 11,129.7 mg/1,000 m^3 in early June (Table 36). Seston was the major component of the load during both sampling seasons with zooplankton (63.2%) predominating in February and detritus (86.9%) in June. As expected, %AFW:seston was lower in winter (4.8%) than in spring (25.6%). Plants were a minor contributor to total river load with the absolute and relative contribution increasing in spring. Benthos also were minor contributors to river load both in winter and spring. Mysids were more abundant in winter than in spring, contributing to a greater percentage of winter (31.7%) than spring (5.1%) benthic biomass. Fish larvae were not present in winter collections and were minor components (0.04%) of spring collections. Differences in all components of river load were statistically significant ($p = 0.05$; Mann-Whitney U-test) between winter and spring.

River Load During Winter--

There were statistically significant ($p = 0.05$; Kruskal-Wallis test) differences in dry-weight concentrations for all components (except mysids) of river load among the three stations; comparisons were based on #2-mesh net collections. Average total river load was 6,835.5 mg/1,000 m^3 at Frechette Point, 5,618.7 mg/1,000 m^3 at Lake Nicolet, and 2,687.2 mg/1,000 m^3 at Lake Munuscong (Table 37). The major component of river load was zooplankton with the percentage increasing downriver as detritus concentrations decreased. Plant and benthic biomass also decreased downriver. Average current velocity decreased from 25.8 cm/sec at Frechette Point, to 18.9 cm/sec at Lake Nicolet, to 4.0 cm/sec at Lake Munuscong. Although average current velocity was considerably lower at Lake Munuscong than at Lake Nicolet, river load composition was similar with detritus accounting for approximately 23% to 27% of the load.

Table 34. Mean zooplankton abundance ($\#/m^3$), current velocity (cm/sec), and weather conditions in day and night collections at Frechette Point, Lake Nicolet, and Lake Munuscong (Point aux Frenes), February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. Weather conditions: 1 = calm, 2 = windy, 3 = very windy.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Parameter	Day	Night	Day	Night	Day	Night
Feb-Mar						
Zooplankton	329.4	296.8	421.1	331.6	160.6	213.9
Current	26.4	25.2	18.7	19.1	4.0	4.0
Weather	-	-	-	-	-	-
Jun						
Zooplankton	228.4	118.1	107.6	71.7	3.1	39.1
Current	38.4	30.1	15.5	12.2	18.9	15.4
Weather	2.0	1.0	1.3	1.0	2.2	2.0

Table 35. Mean zooplankton abundance ($\#/m^3$) and mean animal dry weight (μg) in No. 2-mesh and No. 10-mesh net collections made at Frechette Point, Lake Nicolet, and Lake Munuscong (Point aux Frenes), February 26-March 3, 1985 and June 2-13, 1985.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Net Size	Abundance	Weight	Abundance	Weight	Abundance	Weight
Feb-Mar						
#2	362.6	10.7	403.9	10.8	210.3	11.2
#10	956.2	9.3	769.1	9.3	183.0	8.0
Jun						
#2	240.7	12.1	72.8	11.7	8.8	2.6
#10	541.6	7.0	283.7	3.7	438.7	1.3

Table 36. Mean concentration (mg dry weight/1,000 m^3) and percent composition of the various components of river drift, seston percent (of dry weight) ash-free weight (AFW), and current velocity (cm/sec) during February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

	Winter		Spring	
Parameter	Concentration	Percent	Concentration	Percent
Zooplankton	3,416.3	63.2	1,047.8	9.4
Plants	22.6	0.4	313.1	2.8
Total benthos	45.1	0.8	92.5	0.8
Mysis	14.3	0.3	4.7	0.04
Fish	0.0	0.0	4.8	0.04
Seston	5,338.9	98.8	10,719.3	96.3
Detritus	1,922.6	35.6	9,671.5	86.9
Total	5,406.6		11,129.7	
% AFW:seston	4.8		25.6	
Current	18.1		20.8	

Table 37. Mean concentration (mg dry weight/1,000 m^3) and percent composition of the various components of river drift, seston percent (of dry weight) ash-free weight (AFW), current velocity (cm/sec), and weather conditions by location during February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. Weather conditions: 1 = calm, 2 = windy, 3 = very windy. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Parameter	Concentration	%	Concentration	%	Concentration	%
Feb-Mar						
Zooplankton	3,449.4	50.5	4,069.6	72.4	2,056.2	76.5
Plants	73.0	1.1	3.0	0.1	5.1	0.2
Benthos	87.4	1.3	30.6	0.5	6.3	0.2
Mysis	8.2	0.1	25.4	0.5	2.0	0.1
Fish	0.0	0.0	0.0	0.0	0.0	0.0
Seston	6,674.8	97.7	5,585.1	99.4	2,675.8	99.6
Detritus	3,225.4	47.2	1,515.5	27.0	619.6	23.1
Total	6,835.2		5,618.7		2,687.2	
% AFW:seston	6.4		3.8		4.5	
Current	25.8		18.9		4.0	
Jun						
Zooplankton	2,056.6	8.9	1,047.1	51.7	40.2	0.3
Plants	984.3	4.3	22.2	1.1	33.8	0.3
Benthos	67.2	0.3	122.4	6.1	76.8	0.7
Mysis	6.6	0.0	6.6	0.3	0.0	0.0
Fish	1.7	0.0	10.4	0.5	0.1	0.0
Seston	22,094.0	95.5	1,868.7	92.3	11,618.2	99.1
Detritus	20,037.4	86.6	821.6	40.6	11,578.0	98.7
Total	23,147.2		2,023.7		11,728.9	
% AFW:seston	26.7		24.6		26.9	
Current	34.2		13.9		17.1	
Weather	1.5		1.1		2.1	

Total river load was higher in the channels than in the shallows (Table 38); such differences were significant ($p = 0.05$; Mann-Whitney U-test) at all three locations. Since zooplankton was the major component of river load (and were more abundant in channel stations, Table 32), the greater river load in channel versus shallow stations was expected. Detritus concentrations also were significantly higher in the channels as were current velocities. Differences in plant, benthos, and mysid abundances between channel and shallow stations were not statistically significant ($p = 0.05$; Mann-Whitney U-test and median test).

River load concentration varied with depth strata (Table 39). Total river load varied significantly ($p = 0.05$) with depth (Kruskal-Wallis test for surface versus mid-depth versus bottom comparisons; Mann-Whitney U-test for mid-depth versus bottom comparisons). Total river load decreased with depth, reflecting the decrease in zooplankton abundance and biomass with depth. Current velocity also decreased with depth with differences statistically significant at all three stations. Detritus concentrations were significantly different for the three depth-strata comparisons but not for mid-depth versus bottom comparisons. Since surface samples were collected only in the channels, significant differences based on three-way but not two-way comparisons probably reflect channel effects. Differences in benthos and mysid densities with depth strata were not statistically significant. Thus, there was no apparent relationship between current velocity among various regions of the water column and benthic drift from the sediments. Differences in plant biomass with depth strata were not statistically significant ($p = 0.05$; Mann-Whitney U-test and median test). Median test results were used for those statistical comparisons where a large number of samples did not contain measurable plant biomass.

River load differed between day and night sampling (Table 10). Day versus night comparisons ($p = 0.05$; Mann-Whitney U-test) were statistically significant only for benthos and mysids with biomass increasing at night at all three stations. Current velocities were not significantly different between day and night sampling. This suggests that the greater biomass of benthos and mysids in night over day collections was associated with vertical migration from the river floor.

River load concentration varied between #2-mesh and #10-mesh net collections (Table 41). Zooplankton and seston concentrations were higher in #10-mesh than #2-mesh-net collections at Frechette Point and Lake Nicolet; total river load concentrations also were higher in the #10-mesh net collections. These differences were statistically significant ($p = 0.05$: Mann-Whitney U-test). At Lake Munuscong, zooplankton dry-weight concentrations (but not abundance) were significantly greater in

Table 38. Mean concentration (mg/1,000 m^3) of the various components of river drift, seston percent (of dry weight) ash-free weight (AFW), current velocity (cm/sec), and weather between channel and shallow stations February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. Weather conditions: 1 = calm, 2 = windy, 3 = very windy. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Parameter	Shallow	Channel	Shallow	Channel	Shallow	Channel
Feb-Mar						
Zooplankton	2,960.4	5,079.2	3,428.6	5,047.9	1,670.8	2,698.5
Plants	80.4	58.3	0.1	7.7	8.0	0.4
Benthos	87.2	87.9	40.5	14.2	6.7	5.6
Mysis	8.0	8.8	33.6	11.7	0.6	4.4
Fish	0.0	0.0	0.0	0.0	0.0	0.0
Seston	5,597.3	10,266.7	4,841.8	6,823.9	1,976.7	3,841.0
Detritus	2,636.9	5,187.5	1,359.2	1,760.9	305.9	1,142.5
Total	5,764.9	10,412.9	4,916.0	6,845.8	1,991.4	3,847.0
% AFW:seston	6.4	6.2	3.7	3.9	5.6	2.7
Current	20.5	43.5	13.8	27.3	2.8	6.0
Jun						
Zooplankton	1,776.1	2,991.3	1,022.7	1,095.8	44.3	26.7
Plants	1,254.7	82.9	23.8	18.9	39.5	14.4
Benthos	79.1	27.7	127.4	112.5	93.3	20.1
Mysis	6.9	5.9	3.1	13.7	0.0	0.0
Fish	0.9	4.3	12.4	6.5	0.1	0.4
Seston	24,914.1	12,691.8	2,011.1	1,584.0	15,080.5	219.6
Detritus	23,138.4	9,700.5	988.4	488.2	15,041.0	192.9
Total	26,225.7	12,806.7	2,174.7	1,721.9	15,213.4	254.5
% AFW:seston	28.1	22.0	25.1	23.6	26.9	26.8
Current	29.6	49.3	11.0	19.4	14.8	24.9
Weather	1.5	1.0	1.5	1.1	2.1	2.0

Table 39. Mean concentration (mg dry weight/1,000 m^3) of the various components of river drift, seston percent (of dry weight) ash-free weight (AFW), and current velocity (cm/sec) by depth strata and location, February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

	February-March			June		
Parameter	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
Frechette						
Zooplankton	7,741.4	3,558.8	2,758.1	2,941.7	2,357.7	1,715.0
Plants	72.8	51.3	86.1	37.9	2,298.2	181.0
Benthos	66.2	54.6	114.2	20.1	50.4	85.6
Mysis	18.0	8.5	6.5	10.8	4.3	7.7
Fish	0.0	0.0	0.0	0.6	1.5	2.2
Seston	16,378.0	6,549.7	5,378.0	4,378.5	9,551.8	33,583.0
Detritus	8,636.6	2,290.9	2,619.9	1,436.8	7,194.1	31,868.0
Total	16,517.0	6,655.6	5,578.3	4,437.1	11,901.9	33,868.0
% AFW:seston	7.7	4.0	7.8	16.1	25.8	28.9
Current	40.0	28.9	21.5	52.2	36.4	29.9
Nicolet						
Zooplankton	6,579.6	4,634.2	3,018.6	1,361.6	1,534.4	598.2
Plants	13.3	0.0	2.6	5.2	15.3	31.1
Benthos	6.7	23.8	41.7	45.4	183.3	92.1
Mysis	6.1	20.0	34.3	0.4	8.0	6.9
Fish	0.0	0.0	0.0	8.0	16.2	6.5
Seston	8,908.9	6,134.4	4,342.1	1,685.9	1,926.0	1,864.9
Detritus	2,329.3	1,500.2	1,323.5	324.3	391.7	1,266.7
Total	8,928.9	6,158.2	4,386.4	1,744.4	2,140.8	1,994.6
% AFW:seston	3.7	3.5	4.0	30.8	20.7	26.2
Current	24.6	20.7	16.1	20.7	14.8	11.6
Munuscong						
Zooplankton	2,228.4	2,802.5	1,453.4	27.9	30.9	48.6
Plants	0.0	0.0	10.3	24.2	13.1	49.9
Benthos	8.4	2.3	8.7	2.2	53.5	104.2
Mysis	8.2	1.3	1.0	0.0	0.0	0.0
Fish	0.0	0.0	0.0	0.5	0.1	0.1
Seston	3,228.8	3,487.7	1,930.9	171.1	2,334.7	20,034.4
Detritus	1,000.4	685.2	477.5	143.2	2,303.8	19,984.4
Total	3,245.4	3,490.0	1,949.9	198.0	2,401.4	20,187.2
% AFW:seston	3.7	3.5	5.5	29.0	28.6	25.2
Current	5.7	4.3	3.3	26.2	17.3	15.7

Table 40. Mean concentration (mg/1,000 m^3) of the various components of river drift, seston percent (of dry weight) ash-free weight (AFW), current velocity (cm/sec), and weather during the day and night, February 26-March 3, 1985 and June 2-13, 1985. All estimates based on No. 2-mesh net collections. Weather conditions: 1 = calm, 2 = windy, 3 = very windy. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

	Frechette Point		Lake Nicolet		Lake Munuscong	
Parameter	Day	Night	Day	Night	Day	Night
Feb-Mar						
Zooplankton	3,579.9	3,320.9	4,568.8	3,570.6	1,761.8	2,350.6
Plants	42.6	97.6	5.5	0.4	0.0	10.3
Benthos	7.9	168.4	11.4	49.8	5.3	7.2
Mysis	0.0	16.5	8.3	42.5	0.0	4.2
Fish	0.0	0.0	0.0	0.0	0.0	0.0
Seston	6,538.8	6,810.9	5,868.5	5,301.6	2,270.9	3,080.7
Detritus	2,960.9	3,490.0	1,999.8	1,731.0	509.1	730.9
Total	6,589.3	7,076.9	5,885.4	5,351.9	2,276.2	3,098.2
% AFW:seston	6.0	6.7	3.5	4.1	6.0	3.0
Current	26.4	25.2	18.7	19.1	4.0	4.0
Jun						
Zooplankton	2,729.7	1,408.8	1,260.1	839.8	15.2	65.2
Plants	1,968.0	37.8	23.1	21.2	27.3	40.1
Benthos	66.3	68.0	5.3	231.4	9.6	141.4
Mysis	2.1	11.0	0.0	13.0	0.0	0.0
Fish	1.5	1.9	5.6	15.1	0.1	0.2
Seston	38,846.7	5,973.2	2,549.2	1,207.0	7,742.1	15,419.2
Detritus	36,117.0	4,564.4	1,289.1	367.2	7,726.3	15,354.0
Total	40,882.5	6,080.9	2,583.2	1,474.7	7,763.3	15,600.9
% AFW:seston	32.5	21.1	25.9	23.3	25.2	28.5
Current	38.4	30.1	15.5	12.2	18.9	15.4
Weather	2.0	1.0	1.3	1.0	2.2	2.0

the coarser #2-mesh net collections; the mean size of zooplankton also was larger in the #2-mesh net collections averaging 11.2 μg versus 8.0 μg for the #10-mesh net. Seston and total river load concentrations were significantly higher in the #2-mesh than the #10-mesh net collections at this location. The reason for this difference has no ready explanation. Differences in detritus, plant, benthos, and mysid concentrations between #2-mesh and #10-mesh net collections were not statistically significant among sites. This suggests that these particulates were sufficiently large to be efficiently captured by the #2-mesh net. Although %AFW:seston tended to be higher in #10-mesh than #2-mesh net collections, differences were not statistically significant.

River Load During Spring--

With the exception of mysids and %AFW:seston, differences in June river load composition were significantly ($p = 0.05$; Kruskal-Wallis test) different among Frechette Point, Lake Nicolet, and Lake Munuscong. Total load (dry weight, #2-mesh net) averaged 23,349 mg/1,000 m³ at Frechette Point, 2,021.6 mg/1,000 m³ at Lake Nicolet, and 11,728 mg/1,000 m³ at Lake Munuscong (Table 37). Seston was the major component of the river load at all three stations.

The river apparently carried a greater mineral load in June than in winter (Tables 36, 37) as %AFW:seston was considerably higher in June (25.6%) than in February-March (4.8%). This increase may have been associated with increased inflows from small streams and rivers. It may also have been associated with the disappearance of the protective ice cover which had served to limit wind-induced wave activity and sediment resuspension.

At Frechette Point, zooplankton were a minor component of the June river load averaging 8.9% versus 50.5% in winter (Table 7). This decrease in percent composition was due mainly to the large increase in detritus between winter (3,225.5 mg/1,000 m³) and spring (20,037 mg/1,000 m³) sampling. Plants were more abundant in June (984.3 mg/1,000 m³) than February (73.0 mg/1,000 m³) averaging 22.2% of the total river load versus 1.1% in winter; as in February-March, the greatest biomass of plants was observed at Frechette Point. Benthos and fish, while more abundant in spring than in winter, continued to be minor components of river load. February-June statistical comparisons (Mann Whitney U-test) were significant ($p = 0.05$) for all categories except mysids, seston, and total river load.

At Lake Nicolet, zooplankton were a smaller contributor to total river load in June (51.8%) than February (72.4%) (Table 37). Detritus accounted for an average of 40.6% of the river load in June versus 27.0% in February; however, detritus

Table 41. Mean concentration (mg/dry weight/1,000 m^3) of the various components of river drift and seston percent (of dry weight) ash-free weight (AFW) in No. 2-mesh and No. 10-mesh net collections, February 26-March 3, 1985 and June 2-13, 1985. *Mysis* weights are included in the total benthos weight. Detritus weights are the difference between seston and zooplankton weights.

Parameter	Frechette Point #2	Frechette Point #10	Lake Nicolet #2	Lake Nicolet #10	Lake Munuscong #2	Lake Munuscong #10
Feb-Mar						
Zooplankton	3,863.0	8,856.9	4,375.5	7,170.1	2,345.0	1,458.5
Plants	55.2	89.6	3.3	3.4	1.2	0.6
Benthos	86.1	44.7	22.9	18.3	4.3	4.0
Mysis	6.7	0.4	20.2	14.9	2.8	0.7
Fish	0.0	0.0	0.0	0.0	0.0	0.0
Seston	8,353.4	13,034.9	6,631.5	10,530.5	3,439.6	1,888.7
Detritus	4,490.4	4,178.0	2,238.0	3,360.9	1,094.6	430.2
Total	8,494.7	13,168.3	6,657.7	10,552.2	3,445.0	1,893.3
% AFW:seston	7.3	14.2	4.4	4.9	5.0	10.2
Jun						
Zooplankton	2,905.9	3,770.4	849.2	1,035.5	23.1	585.0
Plants	2,705.8	79.3	53.3	69.0	32.3	43.3
Benthos	76.4	53.0	146.6	47.2	9.3	28.5
Mysis	3.9	0.1	20.8	2.1	0.0	0.4
Fish	3.8	2.1	6.1	13.1	0.2	0.6
Seston	18,722.7	12,857.6	1,258.6	3,023.1	1,299.8	37,625.0
Detritus	15,816.8	8,883.2	400.4	1,987.6	1,276.7	37,040.0
Total	21,508.7	12,992.0	1,464.6	3,152.4	1,341.6	37,697.4
% AFW:seston	26.4	43.2	22.8	45.0	27.9	23.7

concentrations were lower in June than in February. Plants, benthos (excluding mysids), and fish all increased in biomass between February and June but were relatively minor components of river load. All winter-spring comparisons were statistically significant ($p = 0.05$; Mann-Whitney U-test).

At Lake Munuscong, total river load concentration increased markedly between February-March (2,687.2 mg/1000 m^3) and June (11,728 mg/1,000 m^3) (Table 37) although these differences were not statistically significant ($p = 0.05$; Mann-Whitney U-test). Zooplankton accounted for a very small component of the river load, averaging 0.3% in June versus 76.5% in winter. This low contribution was due to a marked decline in zooplankton abundance and mean size between winter and June while detritus concentrations increased 18-fold. Biomass of plants, benthos, and fish increased between winter and spring. With the exception of total river load, all winter-spring statistical comparisons were significant ($p = 0.05$; Mann-Whitney U-test).

As in February-March, there were differences in river load concentration and composition between channel and shallow stations (Table 38). At Frechette Point, zooplankton and mysid biomass was significantly ($p = 0.05$; Mann-Whitney U-test) greater in channel station samples, while benthic biomass was significantly greater in shallow station samples; differences in %AFW:seston also were significant. At Lake Nicolet, zooplankton biomass was significantly greater in channel station samples, while seston biomass was greater at shallow stations. Although detritus concentrations were higher at shallow stations, differences were not significant. At Lake Munuscong, zooplankton, detritus, and seston biomass was greater in shallow station samples, while fish were more abundant in the channel.

Although total river load concentration varied with depth strata at Frechette Point (Table 39), such differences were not significant ($p = 0.05$; Kruskal-Wallis test for three strata comparisons and Mann-Whitney U-test for two-depth comparisons). Differences in zooplankton and detritus biomass (which increased with depth) and benthic biomass (which decreased with depth) were significant. At Lake Nicolet, zooplankton, seston, fish, and total river load biomass varied significantly with depth strata; maximum biomass was observed at mid-depth strata. At Lake Munuscong, benthos, seston, fish, detritus, and total biomass varied significantly among the three depth strata with lowest biomass observed in surface strata. Mid-depth versus bottom comparisons were significant only for benthos.

There were significant differences in river load concentration and composition between day and night studies. At Frechette Point, zooplankton, plant, seston, detritus, and total biomass densities were higher during day collections than night

collections (Table 40); these differences were significant ($p = 0.05$; Mann-Whitney U-test). Current velocities also were significantly higher during the day (38.4 cm/sec versus 30.1 cm/sec). Day-night differences in weather conditions were statistically significant. The weather was windy during the day but calm at night. Differences in benthos, mysid, and fish biomass between day and night sampling were not significant.

At Lake Nicolet, differences in zooplankton, seston, detritus, and total biomass between day and night sampling (Table 1) were significant ($p = 0.05$; Mann-Whitney U-test). In all instances, biomass was higher during the day than during the night. Such differences may have been related to physical factors such as current velocity and resuspension. Current velocities were higher during the day (15.5 cm/sec versus 12.2 cm/sec) and the weather was slightly more windy (1.3 versus 1.0); these differences were significant. Benthos, including mysids, and fish were significantly more abundant at night. This suggests that, in contrast to Frechette Point, some components of the benthic community made diel migrations between the river floor and water column.

At Lake Munuscong, zooplankton and benthos were more abundant at night than during the day, and differences were significant ($p = 0.05$; Mann-Whitney U-test). While the mean sizes of zooplankton collected during day and night collections were similar at Frechette Point (12.0 μg and 11.9 μg) and Lake Nicolet (11.7 μg and 11.7 μg), there were large differences in the mean size of zooplankton in day (4.9 μg) and night (1.7 μg) collections at Lake Munuscong (Table 35). This suggests that the increased biomass of zooplankton at night at Lake Munuscong was associated with the vertical migration of small, epibenthic zooplankton, i.e., immature *Cyclops* spp. and *Mesocyclops edax*. As zooplankton and benthos were minor components of the river load at Lake Munuscong, day and night differences in total river load were not significant. Detritus concentrations were not significantly different between day and night collections despite higher current velocities during daylight hours (18.9 cm/sec versus 15.4 cm/sec). Although it was windier during the day than night (2.2 versus 2.0), these differences were not significant. This suggests that during calm weather (e.g., at Frechette Point), current velocity has a significant effect on river load. However, as the weather becomes more windy, small differences in current velocity may not have as major an effect on river load as increased wave activity resulting from the windier conditions.

River load estimates differed between #2-mesh and #10-mesh net collections (Table 41). At Frechette Point, differences were significant only for fish, total biomass, and %AFW:seston: estimates were higher in #2-mesh than number #10-mesh net

samples. There is no ready explanation for these higher biomass estimates for the #2-mesh net.

At Lake Nicolet, net comparisons were significant for seston, fish, detritus, total biomass and %AFW:seston; the #10-mesh net collected the greater biomass (Table 41). Although zooplankton were significantly more abundant in #10-mesh net collections than #2-mesh net collections, biomass was not significantly different. This is because, although small zooplankton were collected in greater numbers in the #10-mesh-net collection, they apparently did not contribute substantially to biomass.

At Lake Munuscong, net comparisons were significant only for zooplankton, seston, and total biomass; the #10-mesh net collected the greater biomass (Table 41). Although detritus concentrations were higher in the #10-mesh net collections, these differences were not statistically significant ($p = 0.05$; Mann-Whitney U-test).

FISH LARVAE

Lake Herring

Lake herring (*Coregonus artedii*) larvae (total number collected = 281) were collected during all 6 wk of the study and at all seven stations. The total number collected per week (Fig. 12) started at 52, peaked at 80, and then declined to 14 larvae in the last week.

Densities of larvae were generally greatest during the first 3 wk and tapered off during the last 3 wk of May (Fig. 13, Table 42). Mean densities varied from 0 to 1,451 larvae/1,000 m^3. Maximum densities usually occurred at the 1-m depth, but occasionally densities were greater at 2 m. Neither depth had a consistently greater density of larval lake herring over the 6 wk. In the channel, densities were very low with a maximum of only 17 larvae/1,000 m^3. Only 9% of the larvae were collected in the channel.

Although larval lake herring were collected at all seven stations, occurrences and densities varied considerably. Only two larvae were collected in the Edison Hydropower Canal - station 1. At the other six stations, lowest densities and most sporadic occurrences were at stations 3, 4, and 5 (Fig. 13). During the first 3 sampling wk, larval densities were especially high at the 1-m depth at the north Lake Nicolet and east Neebish Island stations. Lower densities occurred at station 7 - north Lake Munuscong, but some larval lake herring were present

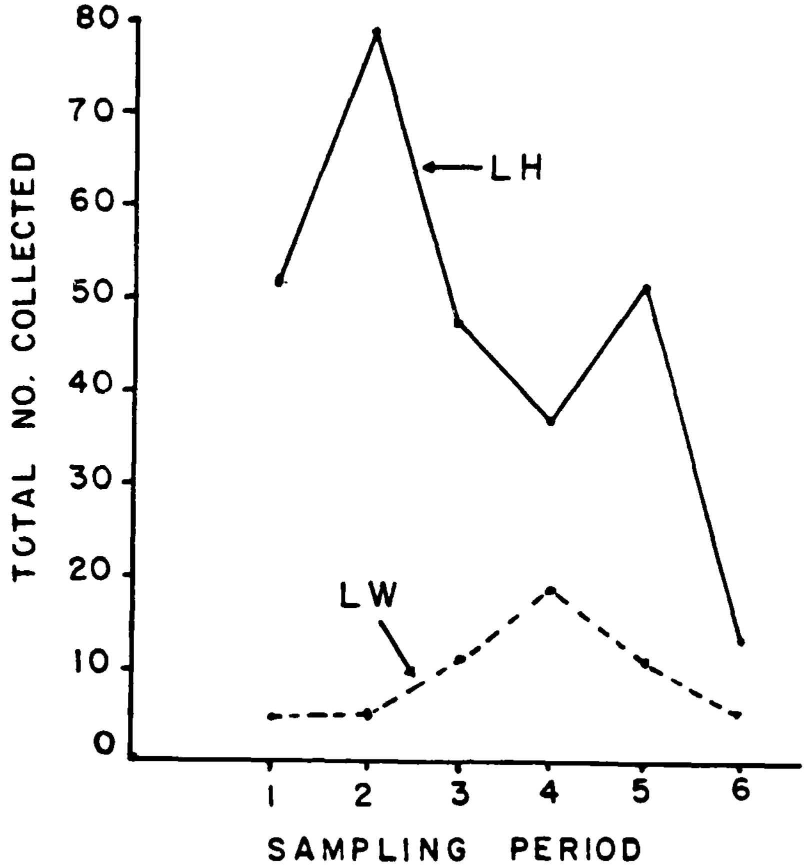


Figure 12. Total number (NO.) of lake herring (LH) and lake whitefish (LW) larvae collected over 6 wk (24 April to 30 May) in the St. Marys River, 1985.

throughout the 6 wk. Densities at the 2-m depth were generally highest at this station.

Average size of larval lake herring increased from April to the end of May (Fig. 14). Since lake herring hatch at 8.5 to 12.8 mm (Auer 1982), the presence of a few 10.2- to 12.0-mm larvae suggests some hatching occurred during the fourth week of May. Based on larval fish sizes, hatching was completed by the last week of May.

The length-frequency distribution of lake herring larvae at all stations below the Sault Power Canal (Fig. 15) showed larvae we collected ranged from about 8 to 25 mm. Modes were observed at about 11 and 17 mm.

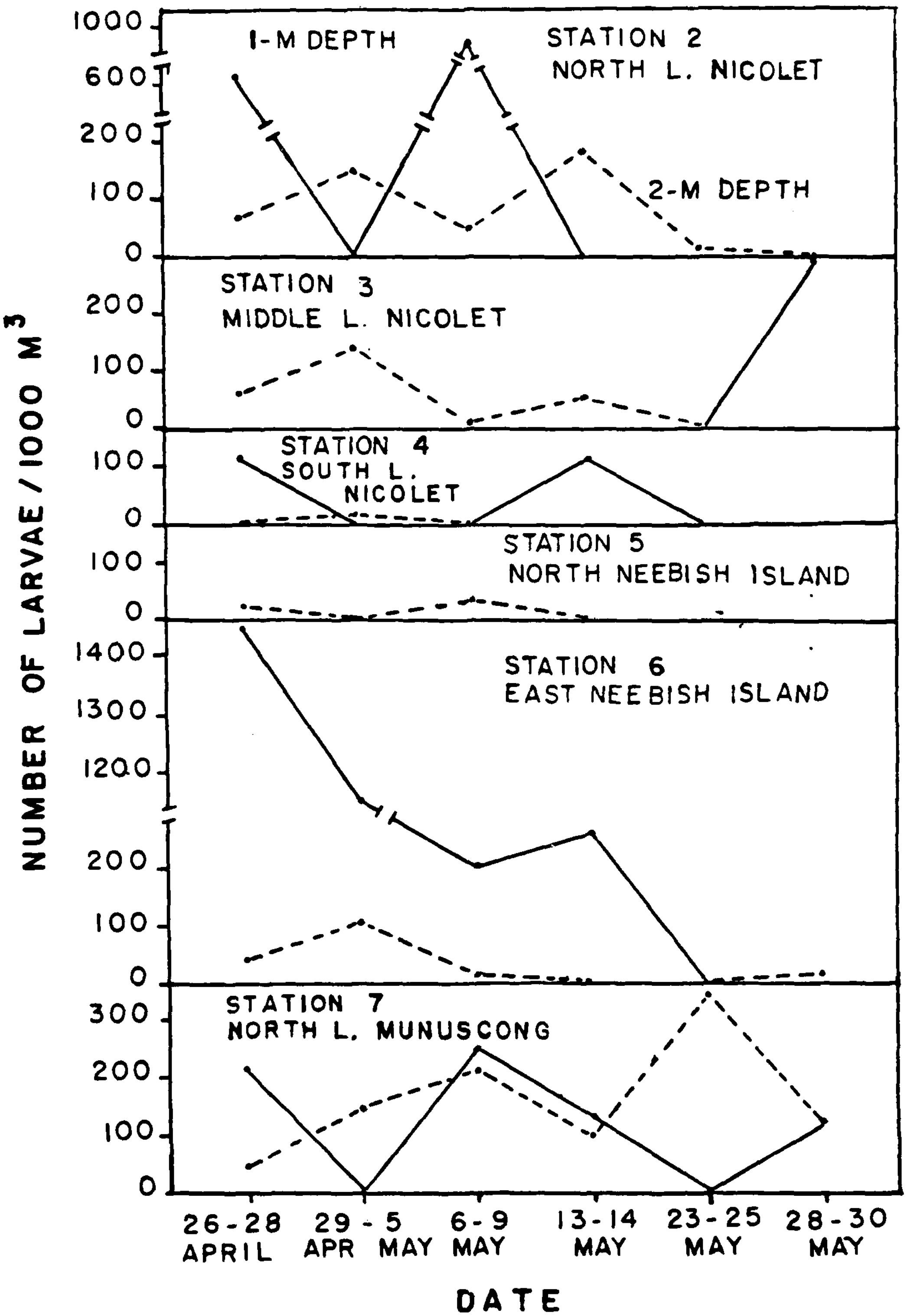


Figure 13. Density of lake herring larvae collected from 26 April to 30 May at six stations in the St. Marys River.

Table 42. Densities (number per 1000 m³) of fish larvae collected at the St. Marys River, April and May 1985. S = stepped oblique tow, from 7 m to surface. See Fig. 3 for station locations.

				Number of larvae per 1000 m³									
Date	Station	Depth (m)	Temp. C	Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m³
4-24-85	1C	0.5	2.5										0
4-24-85	1C	0.5	2.5										0
4-26-85	2A	0.5	6.5	307									307
4-26-85	2A	0.5	6.5	920									920
4-26-85	2B	0.5	5.2	59		29							88
4-26-85	2B	0.5	5.2	70		70							140
4-26-85	2C	S	4.5			38							38
4-26-85	2C	S	4.5			49							49
4-26-85	3A	0.5	6.5		209								209
4-26-85	3A	0.5	6.5										0
4-26-85	3B	0.5	5.2	38									38
4-26-85	3B	0.5	5.2	82									82
4-26-85	3C	S	3.7	6		44							50
4-26-85	3C	S	3.7			56							56
4-28-85	4A	0.5	6.2		211								211
4-28-85	4A	0.5	6.2	224		224							448
4-28-85	4B	0.5	4.9			22							22
4-28-85	4B	0.5	4.9			46							46
4-28-85	4C	S	3.7			56							56
4-28-85	4C	S	3.7	6		67							73
4-28-85	5A	0.5	6.7		205								205
4-28-85	5A	0.5	6.7		294								294
4-28-85	5B	0.5	3.8	46	23								69
4-28-85	5B	0.5	3.8			18							18
4-28-85	5C	S	3.5			444							444
4-28-85	5C	S	3.5	6		98							104
4-28-85	6A	0.5	6.0	1122	224				224				1570
4-28-85	6A	0.5	6.0	1780					197				1977
4-28-85	6B	0.5	4.0	20		121							141
4-28-85	6B	0.5	4.0	62		166							228
4-28-85	6C	S	3.3			219							219
4-27-85	6C	S	3.3	7		271							278
4-27-85	7A	0.5	7.0	218					218				436
4-27-85	7A	0.5	7.0	213									213
4-27-85	7B	0.5	6.0			35							35
4-27-85	7B	0.5	6.0	92		129							221
4-27-85	7C	S	3.2	8		536							544
4-27-85	7C	S	3.2			280							280

Table 42. Continued.

Date	Station	Depth (m)	Temp. C	Number of larvae per 1000 m³: Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m³
5-01-85	1B	0.5	3.5										0
5-01-85	1B	0.5	3.5										0
5-01-85	2A	0.5	5.1										0
5-01-85	2A	0.5	5.1		204								204
5-01-85	2B	0.5	4.5	246									246
5-01-85	2B	0.5	4.5	59		19							78
5-01-85	2C	S	4.6			25							25
5-01-85	2C	S	4.6			40							40
4-30-85	3A	0.5	8.4										0
4-30-85	3A	0.5	8.4		202								202
4-30-85	3B	0.5	7.2	113									113
4-30-85	3B	0.5	7.2	167									167
4-30-85	3C	S	4.0			44							44
4-30-85	3C	S	4.0	5		23							28
4-30-85	4A	0.5	12.0		196								196
4-30-85	4A	0.5	12.0										0
4-30-85	4B	0.5	5.8	19									19
4-30-85	4B	0.5	5.8			20							20
4-30-85	4C	S	4.0			42							42
4-30-85	4C	S	4.0			133							133
4-30-85	5A	0.5	9.7										0
4-30-85	5A	0.5	9.7										0
4-30-85	5B	0.5	6.0			18							18
4-30-85	5B	0.5	6.0			36							36
4-30-85	5C	S	3.4			157							157
4-30-85	5C	S	3.4	6		97							103
4-29-85	6A	0.5	8.2	1401		233							1634
4-29-85	6A	0.5	8.2	897		2019				224			3140
4-29-85	6B	0.5	6.8	158		246							404
4-29-85	6B	0.5	6.8	52	17	705							774
4-29-85	6C	S	5.3	7		528							535
4-29-85	6C	S	5.3	6		332							338
4-29-85	7A	0.5	8.3			346							346
4-29-85	7A	0.5	8.3			821							821
4-29-85	7B	0.5	8.5	174	38	232				38			482
4-29-85	7B	0.5	8.5	134	19	517							670
4-29-85	7C	S	4.5	13		393							406
4-29-85	7C	S	4.5	31		348							379

Table 42. Continued.

Date	Sta-tion	Depth (m)	Temp. C	Number of larvae per 1000 m^3: Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m^3
5-06-85	1B	0.5	3.8			22							22
5-06-85	1B	0.5	3.8								21		21
5-09-85	2A	0.5	6.1	766									766
5-09-85	2A	0.5	6.1	1168									1168
5-09-85	2B	0.5	5.9	52									52
5-09-85	2B	0.5	5.9	39	39	39							117
5-09-85	2C	S	3.5			76							76
5-09-65	2C	S	3.5	8		58							66
5-08-85	3A	0.5	11.5										0
5-08-85	3A	0.5	11.5										0
5-08-85	3B	0.5	7.5										0
5-08-85	3B	0.5	7.5	18		37							55
5-08-85	3C	S	3.6			88							88
5-08-85	3C	S	3.6			100							100
5-08-85	4A	0.5	11.6		989								989
5-08-85	4A	0.5	11.6		217								217
5-08-85	4B	0.5	6.3			18							18
5-08-85	4B	0.5	6.3			91							91
5-08-85	4C	S	4.1			138							138
5-08-85	4C	S	4.1			73							73
5-07-85	5A	0.5	9.5										0
5-07-85	5A	0.5	9.5										0
5-07-85	5B	0.5	8.5	64		21							85
5-07-85	5B	0.5	8.5			18							18
5-07-85	5C	S	4.7	13		114							127
5-07-85	5C	S	4.7			160							160
5-07-85	6A	0.5	9.5	401	200								601
5-07-85	6A	0.5	9.5							219			219
5-07-85	6B	0.5	6.5	22		177							199
5-07-85	6B	0.5	6.5			258							258
5-07-85	6C	S	5.5			379							379
5-07-85	6C	S	5.5			663							663
5-06-85	7A	0.5	9.6			541							541
5-07-85	7A	0.5	9.6	501	669	167							1337
5-07-85	7B	0.5	7.4	104		272							376
5-07-85	7B	0.5	7.4	318		149							467
5-07-85	7C	S	4.4			347							347
5-06-85	7C	S	4.4			345							345

Table 42. Continued.

Date	Station	Depth (m)	Temp. C	Number of larvae per 1000 m³: Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m³
5-15-85	1B	0.5	5.0			12							12
5-15-85	1B	0.5	5.0										0
5-14-85	2A	0.5	11.0										0
5-14-85	2A	0.5	11.0				368						368
5-14-85	2B	0.5	9.0	257	91	36	36						420
5-14-85	2B	0.5	9.0	91	68	22							181
5-13-85	2C	S	5.5			38							38
5-13-85	2C	S	5.5			32							32
5-13-85	3A	0.5	12.0	575	575								1150
5-13-85	3A	0.5	12.0		501								501
5-13-85	3B	0.5	8.8	22									22
5-13-85	3B	0.5	8.8	75		37							112
5-13-85	3C	S	6.3			96	5						101
5-13-85	3C	S	6.3			40	5				5		50
5-13-85	4A	0.5	14.0		920								920
5-13-85	4A	0.5	14.0	213	213					1283			1709
5-13-85	4B	0.5	7.5			82							82
5-13-85	4B	0.5	7.5			101	40						141
5-13-85	4C	S	5.0			263							263
5-13-85	4C	S	5.0			124	13				6		143
5-15-85	5A	0.5	10.0										0
5-15-85	5A	0.5	10.0			209							209
5-15-85	5B	0.5	9.5		21	64							85
5-15-85	5B	0.5	9.5			129	21						150
5-14-85	5C	S	7.0			64	6						70
5-14-85	5C	S	7.0			75	17						92
5-14-85	6A	0.5	11.5	283	283					566			1132
5-14-85	6A	0.5	11.5	243									243
5-14-85	6B	0.5	10.0			18							18
5-14-85	6B	0.5	10.0			36							36
5-14-85	6C	S	7.5			81							81
5-14-85	6C	S	7.5			79							79
5-14-85	7A	0.5	15.5					7793					7793
5-14-85	7A	0.5	15.5	262				2891					3153
5-14-85	7B	0.5	12.5	18		18		37					73
5-14-85	7B	0.5	12.5	177		66		177					420
5-14-85	7C	S	8.0			232							232
5-14-85	7C	S	8.0			98	6						104

Table 42. Continued.

Date	Station	Depth (m)	Temp. C	Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m³
				Number of larvae per 1000 m³									
5-22-85	1B	0.5	8.6	20		261	669						950
5-22-85	1B	0.5	8.6			190	1043						1233
5-25-85	2A	0.5	9.8					5426					5426
5-25-85	2A	0.5	9.8					16148					16148
5-25-85	2B	0.5	8.8	21			428	85					534
5-25-85	2B	0.5	8.8			37	94	265		18			414
5-25-85	2C	S	6.7			131	302						433
5-25-85	2C	S	6.7			163	571	8					742
5-24-85	3A	0.5	11.6										0
5-24-85	3A	0.5	11.6										0
5-24-85	3B	0.5	10.4		17	35	89						141
5-24-85	3B	0.5	10.4			183	122						305
5-24-85	3C	S	8.7			89	351						440
5-24-85	3C	S	8.7	7		178	387						572
5-24-85	4A	0.5	10.6			613		613		920			2146
5-24-85	4A	0.5	10.6					423					423
5-24-85	4B	0.5	9.4				170						170
5-24-85	4B	0.5	9.4				312	66					378
5-24-85	4C	S	8.7			256	447						703
5-24-85	4C	S	8.7			202	446	6					654
5-24-85	5A	0.5	11.2				707	353		353			1413
5-24-85	5A	0.5	11.2		347								347
5-24-85	5B	0.5	9.8			24	24	24					72
5-24-85	5B	0.5	9.8				68	22					90
5-23-85	5C	S	7.7	5		135	175						315
5-24-85	5C	S	7.7	17		177	183						377
5-23-85	6A	0.5	8.7										0
5-23-85	6A	0.5	8.7		225								225
5-23-85	6B	0.5	8.9			52		26					78
5-23-85	6B	0.5	8.9			100	20	40					160
5-23-85	6C	S	8.7			93	114	5					212
5-23-85	6C	S	8.7	5		82	77	5					169
5-23-85	7A	0.5	9.6					1607		200			1807
5-23-85	7A	0.5	9.6					4441					4441
5-23-85	7B	0.5	12.3	343		65		3210					3618
5-23-85	7B	0.5	12.3	337	159			13777					14273
5-23-85	7C	S	8.7	11		39	147	130			5		332
5-23-85	7C	S	8.7			110	220	175					505

Table 42. Continued.

Date	Sta-tion	Depth (m)	Temp. C	Number of larvae per 1000 m³: Lake herring	Lake whitefish	Burbot	Rainbow smelt	Yellow perch	Emerald shiner	Spottail shiner	Deepwater sculpin	Unidentified larvae	Total number of larvae per 1000 m³
5-27-85	1B	0.5	6.8			21	318						339
5-27-85	1B	0.5	6.8			71	359						430
5-30-85	2A	0.5	6.8					187					187
5-30-85	2A	0.5	6.8										0
5-30-85	2B	0.5	8.5				171						171
5-30-85	2B	0.5	8.5			16	320						336
5-29-85	2C	S	6.8			48	152						200
5-29-85	2C	S	6.8			52	104						156
5-28-85	3A	0.5	11.8		501	501							1002
5-28-85	3A	0.5	11.8			250							250
5-28-85	3B	0.5	11.8				537						537
5-28-85	3B	0.5	11.8			61	1682						1743
5-28-85	3C	S	6.8			141	70						211
5-28-85	3C	S	6.8			98	196						294
5-28-85	4A	0.5	7.2		233		233	467					933
5-28-85	4A	0.5	7.2					391					391
5-28-85	4B	0.5	7.8				211						211
5-28-85	4B	0.5	7.8				282						282
5-28-85	4C	S	10.8			76	341						417
5-28-85	4C	S	10.8			28	198						226
5-30-85	5A	0.5	8.0					438					438
5-30-85	5A	0.5	8.0					331					331
5-30-85	5B	0.5	8.8			53	447	35					535
5-30-85	5B	0.5	8.8			21	2640	64					2725
5-30-85	5C	S	5.5			66	158	6					230
5-30-85	5C	S	5.5			63	135						198
5-29-85	6A	0.5	7.2							144			144
5-29-85	6A	0.5	7.2					278					278
5-29-85	6B	0.5	8.6	16			654						670
5-29-85	6B	0.5	8.6			43	2179						2222
5-29-85	6C	S	5.8			67	1932						1999
5-29-85	6C	S	5.8			59	1573						1632
5-29-85	7A	0.5	7.8					1962					1962
5-29-85	7A	0.5	7.8	218				2834		436			3488
5-29-85	7B	0.5	6.2	227			1212	75				18	1532
5-29-85	7B	0.5	6.2		60		221	301					582
5-29-85	7C	S	5.8			49	2891						2940
5-29-85	7C	S	5.8			66	2455						2521

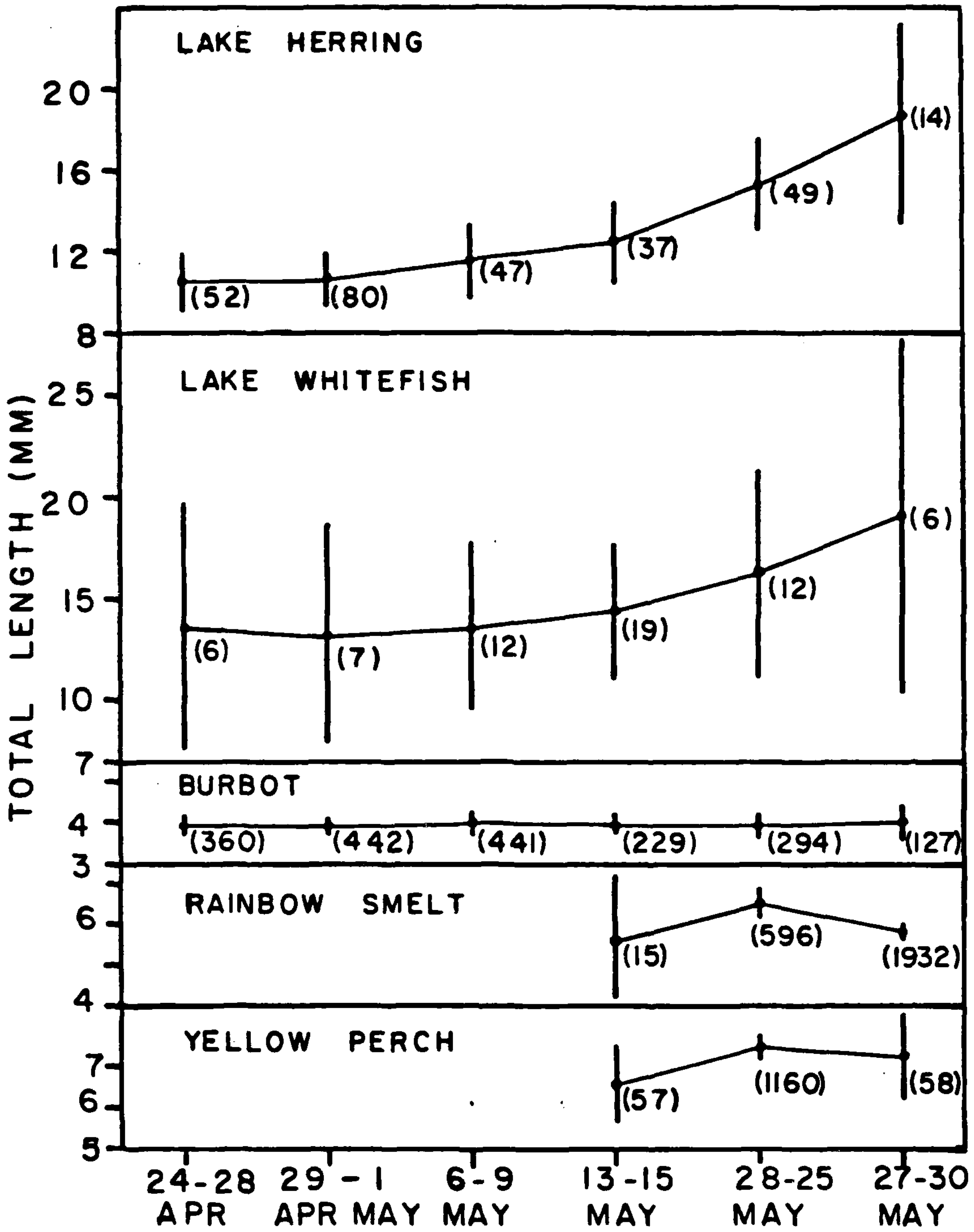


Figure 14. Mean total length and standard error (vertical lines) of five larval fish species collected in the St. Marys River, 1985. Total number collected is in parentheses. Sizes of larvae collected at Station 1 (Edison Hydropower Canal) are not included.

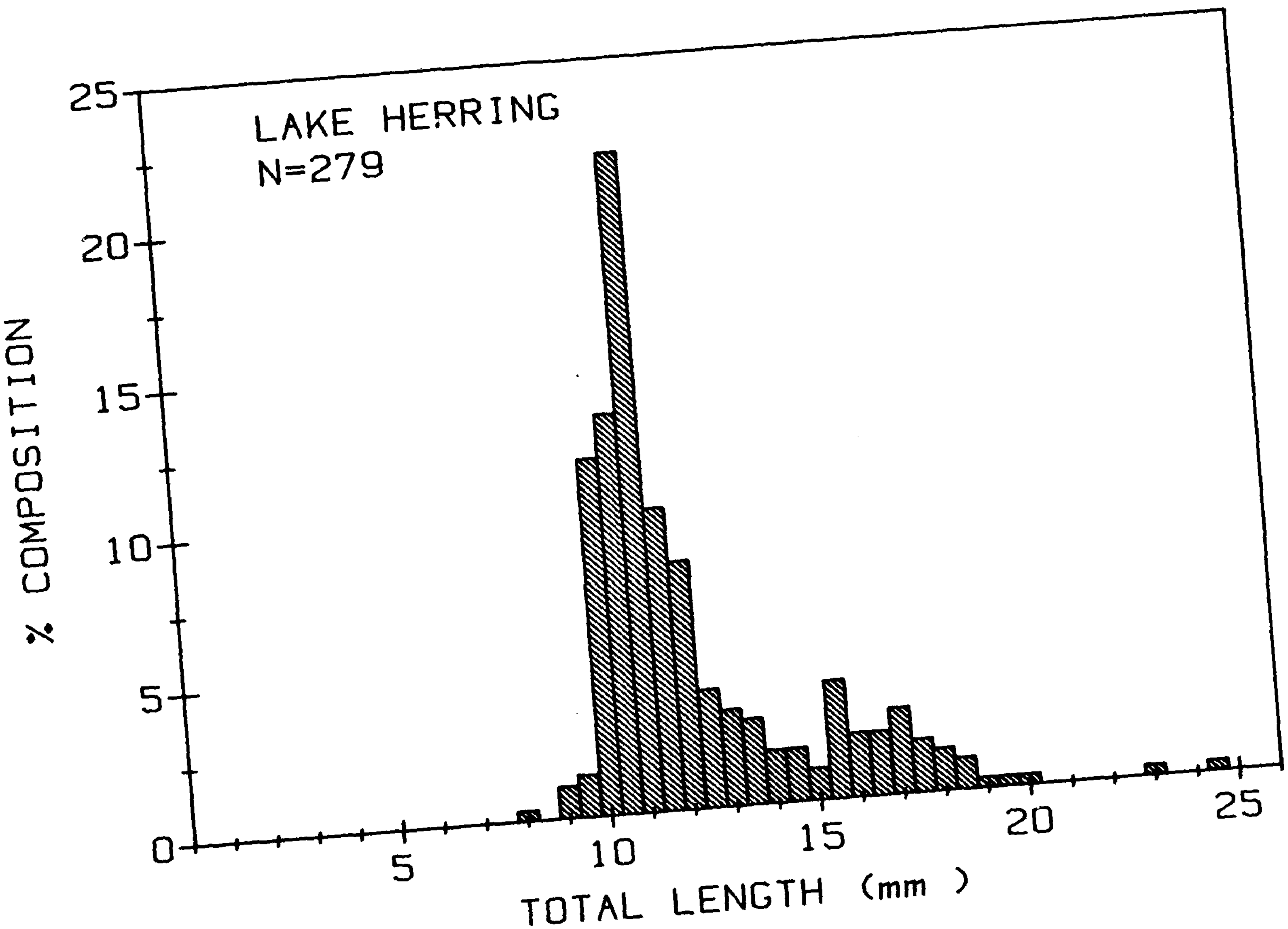


Figure 15. Length-frequency distribution of all lake herring larvae collected from the St. Marys River at stations 2-7 during 24 April-29 May 1985.

The percentage of the lake herring collected that were non-yolk-sac larvae increased almost linearly over the course of the study (Fig. 16) from 0 to 2% in the first 2 wk, up to 100% during the last week. Therefore, the decline in the total number of larvae that we collected, from 52 in week 1 to 14 in week 6, is partially attributable to net avoidance as well as natural mortality as the larvae grow older. Overall, 61% of all lake herring larvae collected were yolk-sac larvae and 39% were non-yolk-sac larvae.

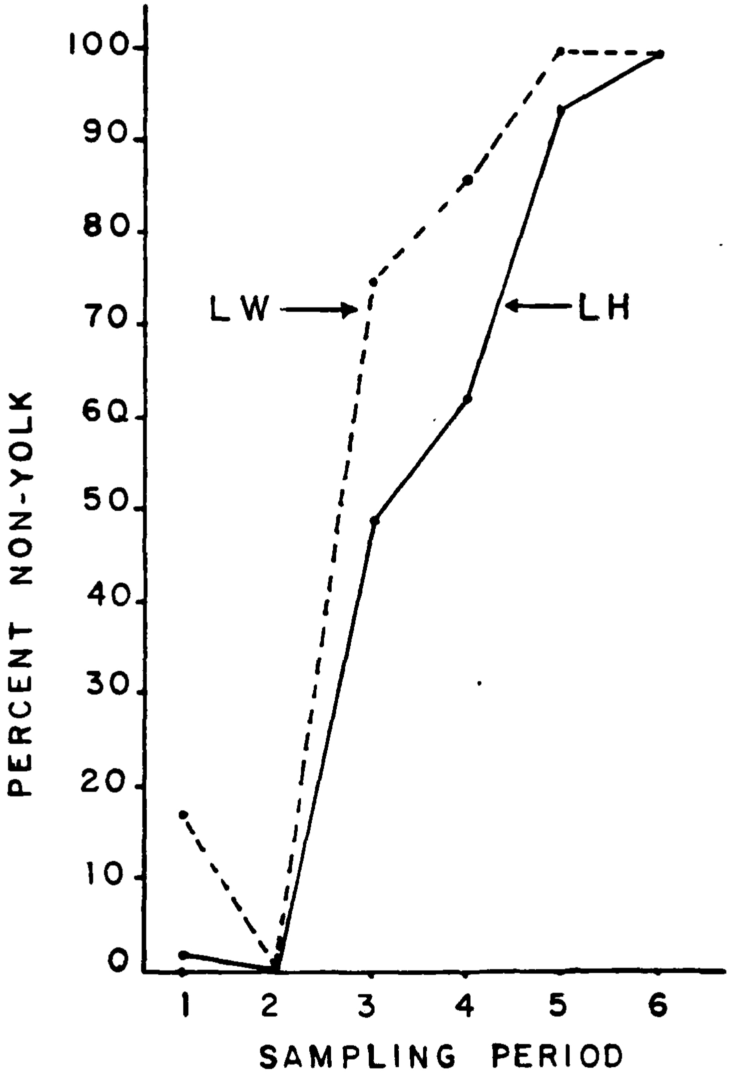


Figure 16. Percentage of non-yolk-sac lake herring (LH) and lake whitefish (LW) larvae collected over 6 wk (24 April to 30 May) in the St Marys River, 1985.

Lake Whitefish

Lake whitefish (*Coregonus clupeaformis*) larvae were collected during all 6 wk of the study and at six of the seven stations. Larvae were not collected in the Edison Hydropower Canal. A total of 62 larvae were captured, making them less abundant than lake herring. The total number of lake whitefish larvae collected per week (Fig. 12) increased gradually from 6-7 in weeks 1 and 2 to a peak of 19 at week 4, and then a gradual decline to 6 in the last week of May.

Densities were generally greatest during the first 2 wk of May (Fig. 17). Maximum densities occurred at 1-m depths and ranged from about 600 to 1,000 larvae/1,000 m^3. Few lake whitefish larvae were captured at 2 m, and none were caught in the channel. Although present at the six stations, occurrences and densities varied considerably among stations. The middle and south Lake Nicolet stations produced the most larvae.

Average sizes of lake whitefish larvae increased from April to the end of May (Fig. 14). Hatching appeared to be over by mid-May as few smaller larvae were collected thereafter. Lake whitefish larvae collected ranged from about 12 to 23 mm (Fig. 18). There were modes at around 14 mm and 22 mm; the latter group was collected during the last week of the study. Lake whitefish hatch at sizes of 8.8-15 mm (Auer 1982). The curve for the percentage of lake whitefish larvae that were non-yolk-sac (Fig. 16) followed the same pattern observed for lake herring. Percentages were low in weeks 1 and 2 and then increased dramatically to 100% in weeks 5 and 6. Overall, unlike lake herring where the pattern was reversed, 29% of the lake whitefish larvae were yolk-sac larvae, while 71% were non-yolk-sac larvae.

Burbot

Burbot (*Lota lota*) larvae were collected during all 6 wk of the study and at all seven stations. A total of 1,893 larvae were collected.

Larval burbot densities peaked during the first week of May at the two stations farthest downstream (Table 42). These two stations also produced the highest densities recorded (1,126 and 584 larvae/1,000 m^3) and were overall the most productive for burbot larvae. Peak densities at the other five stations occurred from mid-May to the end of May. Liston et al. (1985) collected burbot larvae from April to July with peak numbers in May.

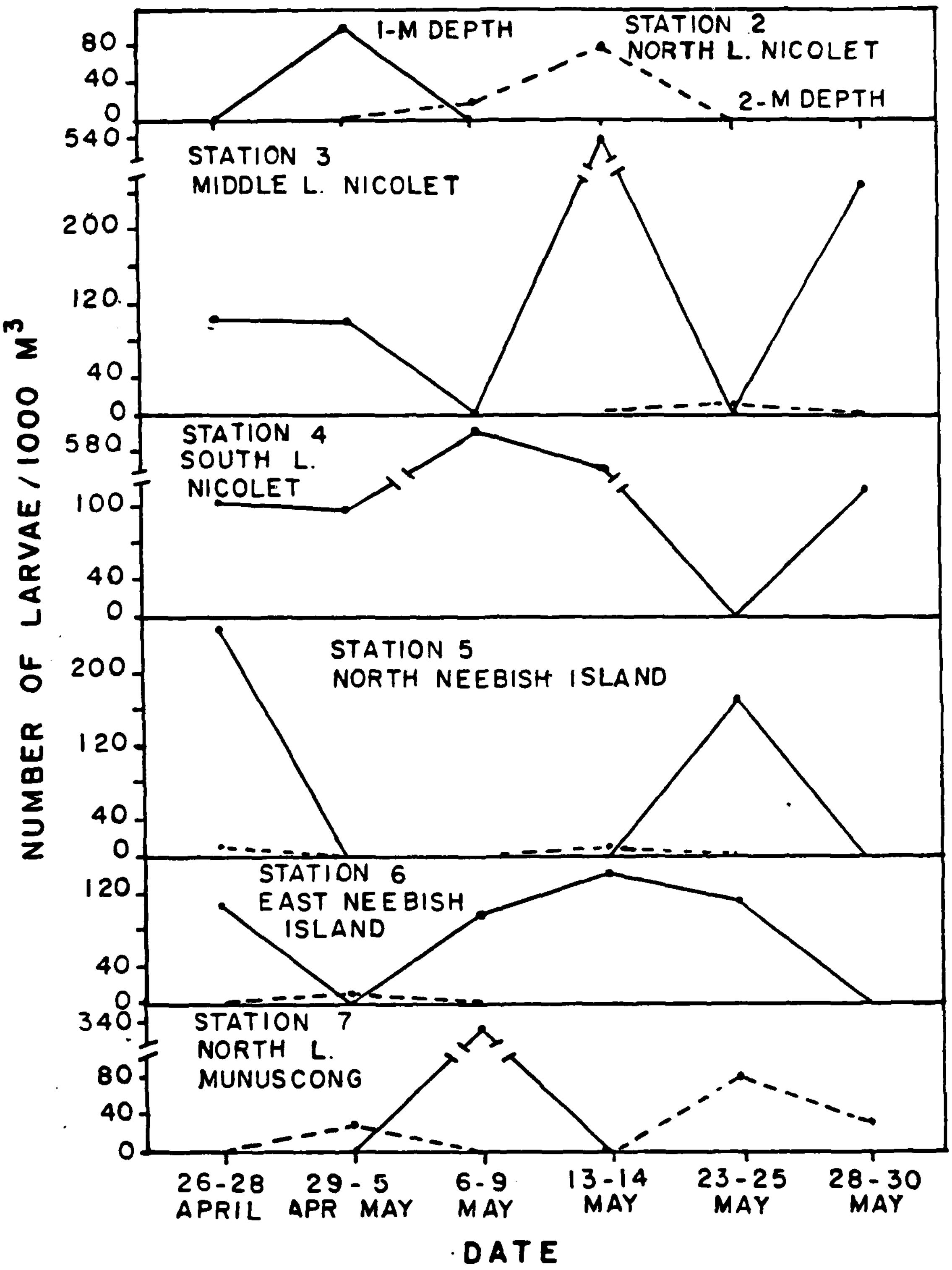


Figure 17. Density of lake whitefish larvae collected from 26 April to 30 May at six stations in the St. Marys River.

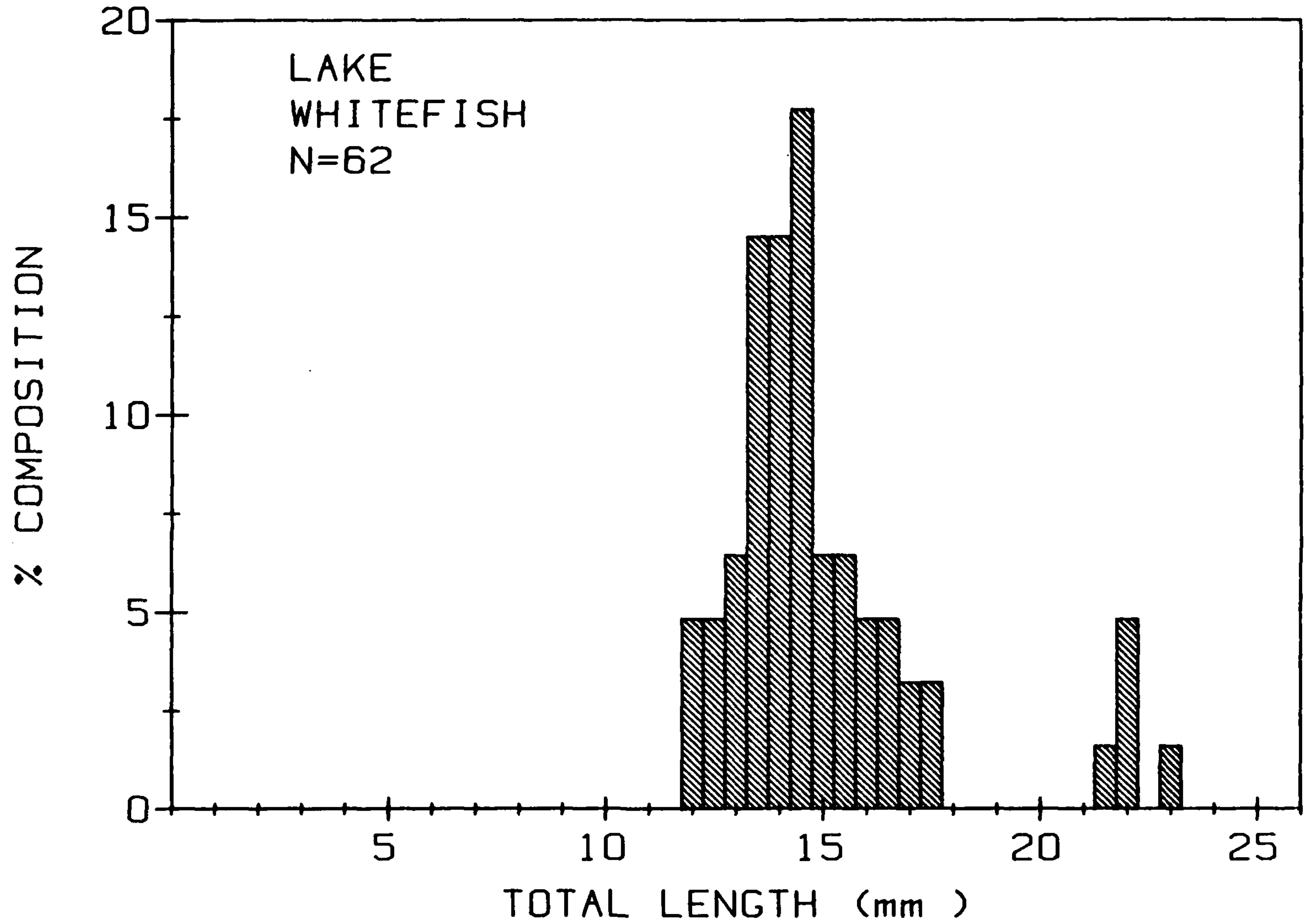


Figure 18. Length-frequency distribution of all lake whitefish larvae collected from the St. Marys River at stations 2-7 during 24 April-29 May 1985.

Burbot larvae were most consistently present in channel samples, however, occurrences were similar between the channel and the 2-m depth. At 1 m, occurrences were sporadic, but peak densities occurred there at three stations. These patterns from the three sampling gear used in 1985 are very similar to the findings of Liston et al. (1985) for 1982 and 1983.

Mean size of burbot larvae changed only slightly over the 6 sampling wk, suggesting continual hatching and recruitment throughout late April and all of May (Figs. 14, 19). Liston et al. (1985) found little change in larval burbot sizes until late June-early July. These results suggest an extended hatching period for burbot in the St. Marys River.

In summary, burbot larvae occur throughout the St. Marys River system. This suggests that burbot spawn throughout the system, but transport from localized areas cannot be dismissed. Burbot larvae are passively dispersed by currents shortly after hatching (Mansfield et al. 1983). The area around Neebish Island appears to be the most productive for burbot. Overall the river is moderate in burbot production, as the peak density of almost 1,500 larvae/1,000 m^3 (Table 43) was 16 times less than the 24,000 larvae/1,000 m^3 found in Green Bay near Escanaba, Michigan (Mansfield et al. 1983).

Rainbow Smelt

Rainbow smelt (*Osmerus mordax*) larvae were not collected until 13 May (Table 42). Liston et al. (1983, 1985) also found initial occurrences of rainbow smelt in mid-May during 1981 and 1982, however in 1983 initial occurrence was on 5 May, suggesting earlier spawning. We found peak densities at most stations during the last week of May; however, these may not be seasonal peaks as Liston et al. (1985) found peak densities during the first 2 wk of June. Liston et al. (1985) also recorded a peak density of just over 20,000 larvae/1,000 m^3 which was more than 7 times greater than the peak density of just over 2,600 larvae/ 1,000 m^3 that we found (Table 43).

We collected rainbow smelt larvae at all seven stations. In general, densities were greatest at the three stations around Neebish Island. Liston et al. (1985) also found greatest densities near the island. We found occurrences of larvae to be similar in the channel and at the 2-m depth. Occurrences were very sporadic at the 1-m depth. Greatest densities usually occurred in the channel, although at two stations maximum densities occurred at the 2-m depth. Overall these results agree with those of Liston et al. (1985) regarding the three depth zones.

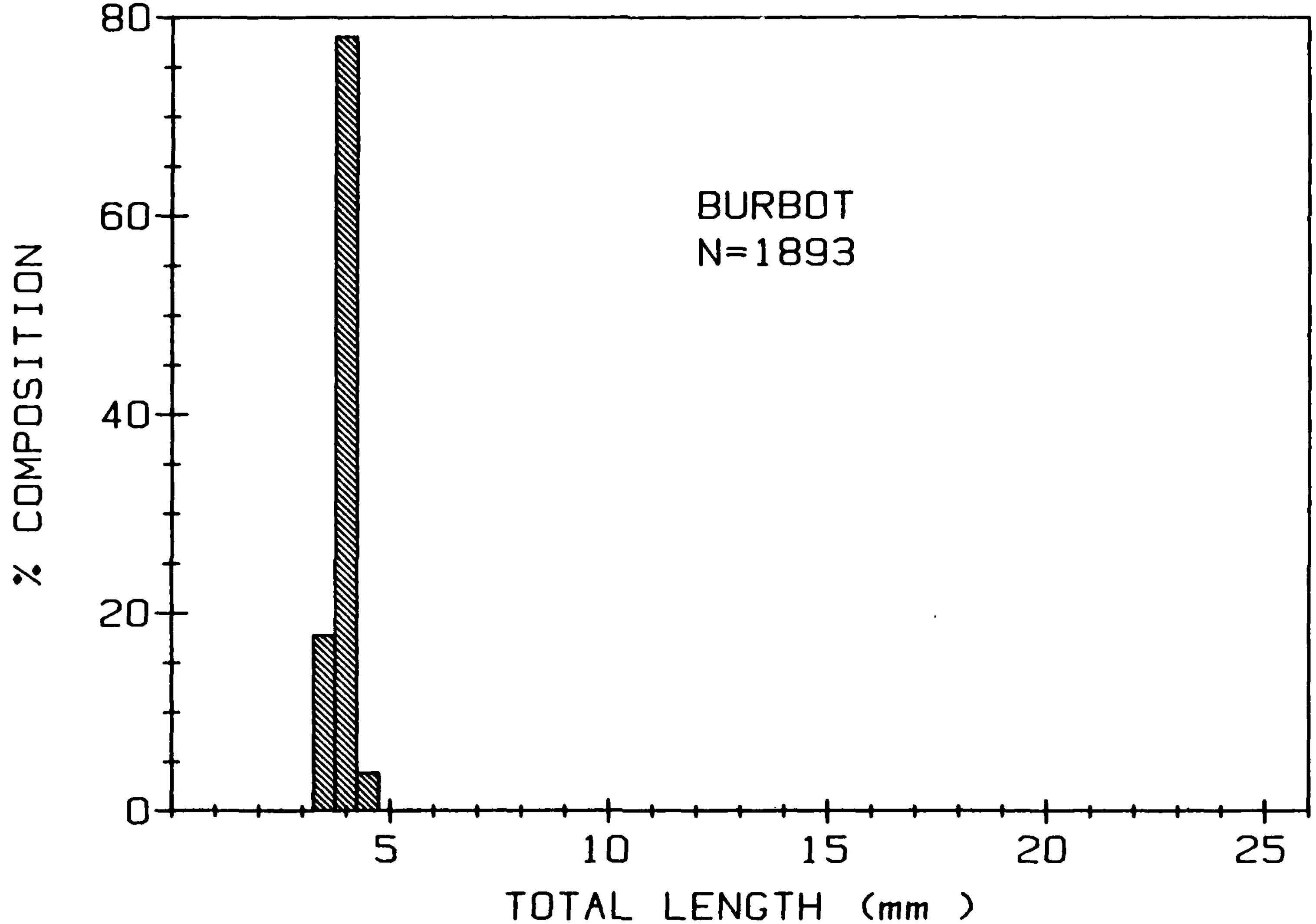


Figure 19. Length-frequency distribution of burbot larvae collected from the St. Marys River at stations 2-7 during 24 April-29 May 1985.

Table 43. Maximum larval fish densities (number/1,000 m^3) of various fish species sampled in the St. Marys River.

Species	Liston et al. (1983, 1985) 1981	1982	1983	Present study 1985
Lake herring *Coregonus artedii*	340	4,970	2,030	1,450
Lake whitefish *Coregonus clupeaformis*	2,380	770	4,300	603
Burbot *Lota lota*	260	1,490	280	1,130
Rainbow smelt *Osmerus mordax*	15,400	2,590	20,100	2,670
Yellow perch *Perca flavescens*	14,500	35,400	14,500	10,800

Mean sizes of rainbow smelt larvae changed only slightly over the last 3 wk of May (Fig. 14). Lengths ranged from 4.5 to 10 mm with a mode at 5.5 mm (Fig. 20). This suggests continual hatching of fish larvae during this period. Liston et al. (1985) found rainbow smelt larval sizes did not increase noticeably until the end of June.

In summary, rainbow smelt production is moderate to high in the St. Marys River. The waters around Neebish Island appear to be the most productive.

Yellow Perch

Yellow perch (*Perca flavescens*) larvae, like rainbow smelt, were not collected until mid-May (Table 42). Densities peaked during the last two weeks in May. A peak density of almost 11,000 larvae/1,000 m^3 was recorded (Table 43). This may be a seasonal peak as Liston et al. (1985) found peak densities at the end of May.

We collected yellow perch larvae at five of the seven stations. Larvae were absent from the Edison Hydropower Canal

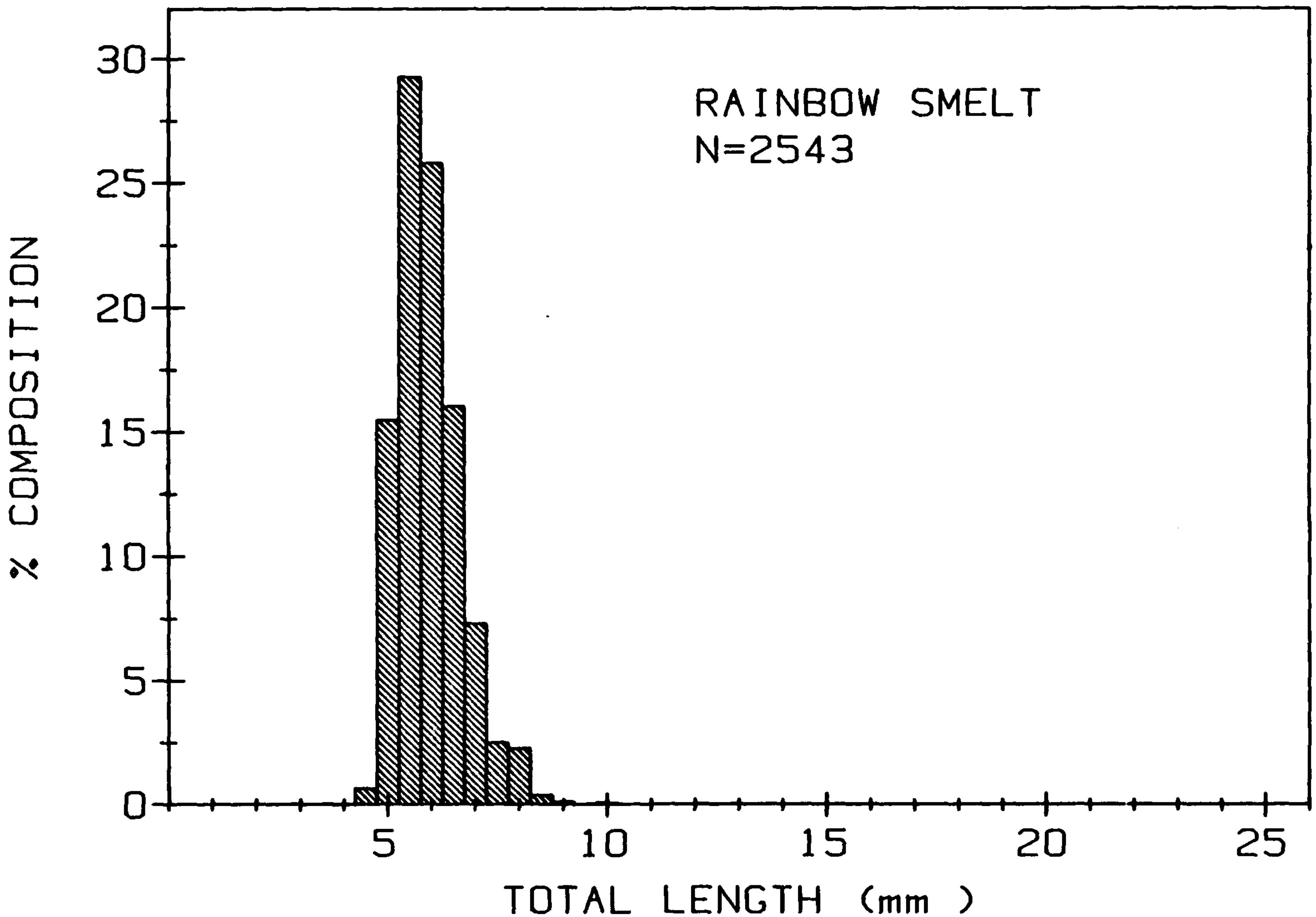


Figure 20. Length-frequency distribution of all rainbow smelt larvae collected from the St. Marys River at stations 2-7 during 24 April-29 May 1985.

and at the middle Lake Nicolet stations. Lack of larvae in the canal may be due to later spawning in the Lake Superior area, as Liston et al. (1985) did not collect larvae there until late June and early July. Greatest densities occurred at the north Lake Munuscong station, although the overall peak density occurred at the north Lake Nicolet station. Liston et al. (1985) also found the greatest densities in Lake Munuscong. Peak densities of 11,000 to 35,000 larvae/1,000 m^3 (Table 43) indicate that the St. Marys River system, especially Lake Munuscong, is very productive for yellow perch.

Overall we found greatest densities at 1 m, although the second-highest density occurred at the 2-m depth. Densities were low and occurrences sporadic in the channel. These results agree with those of Liston et al. (1985) regarding depth zones.

Mean sizes of yellow perch changed slightly over the 3 sampling wk. Larvae ranged from 5.5 to 10 mm with one mode at 7.5 mm (Fig. 21). This suggests continual hatching over this period. Sizes of larval yellow perch recorded by Liston et al. (1985) did not increase substantially until the beginning of June.

In summary, the St. Marys River, especially Lake Munuscong, is very productive for yellow perch larvae. Spawning must occur in late April to mid-May and larvae densities peak in late May.

Other Species

Three emerald shiner (*Notropis atherinoides*) larvae from 20.5 to 22.5 mm were collected during the first week of sampling at stations 6 and 7. Since we arbitrarily defined larvae as any fish ≤25.4 mm, we sometimes, as in this case, collect fish which were hatched the year before. A similar case occurred for spottail shiner. The fish collected were also yearlings produced in 1984. They ranged in length from 19 to 25 mm and in density from 6 to 1,283/1,000 m^3. Spottail shiners were present during all weeks of sampling except the first, and occurred at four (stations 4-7) of the seven stations sampled.

There were four deepwater sculpin (*Myoxocephalus thompsoni*) collected during the study; they ranged from 10.0 to 17.1 mm. They were collected at the Edison Hydropower Canal (week 3), in the channel at stations 3 and 4 (week 4), and in the channel at station 7 (week 5). We concluded from these data that these larvae probably originated from Lake Superior, as they were exclusively collected in the channel where passive transport would be most probable. Also, deepwater sculpin are not known to spawn in connecting river systems, but are believed always to spawn in deep waters of the Great Lakes (Scott and Crossman 1973;

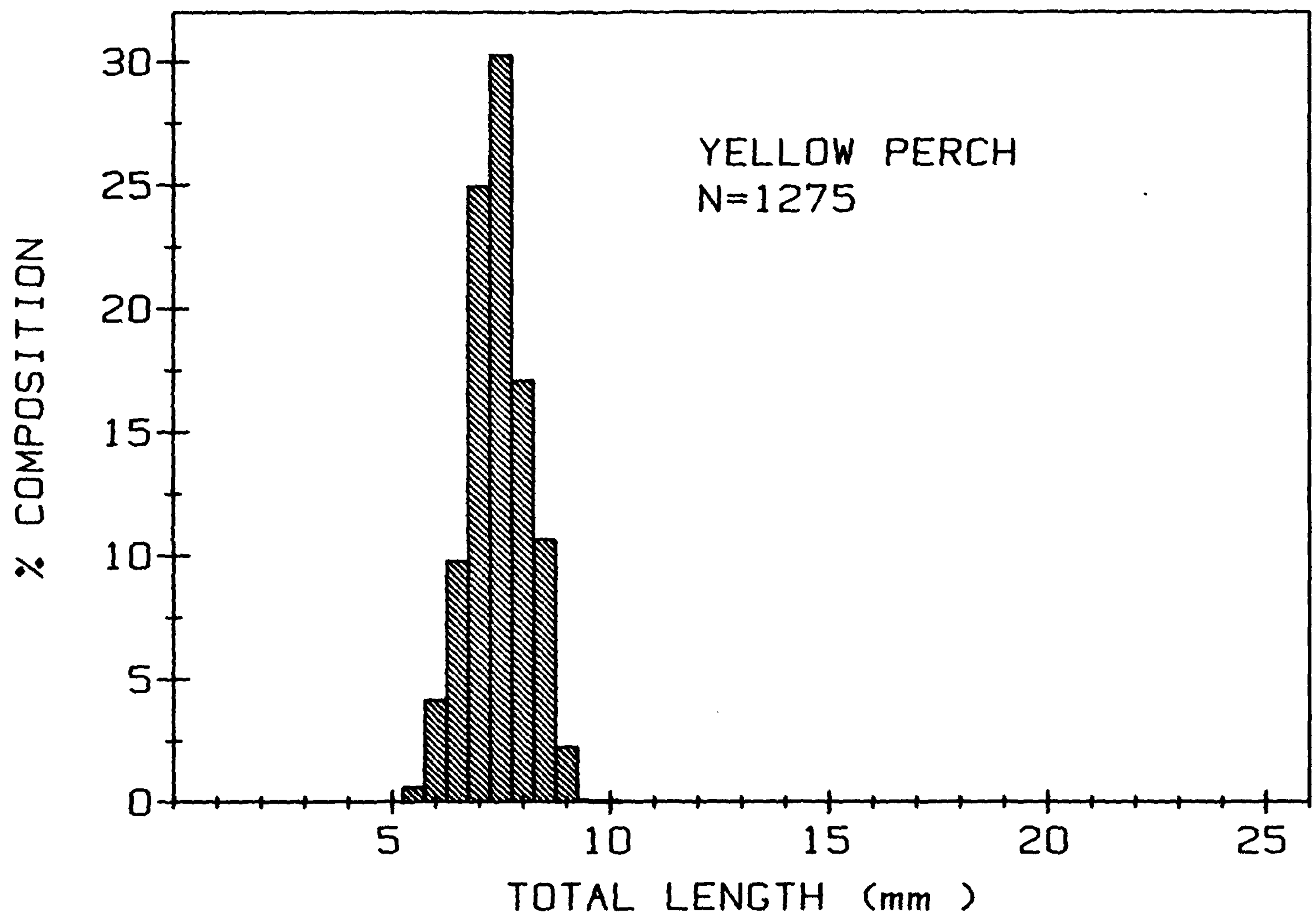


Figure 21. Length-frequency distribution of all yellow perch larvae collected from the St. Marys River at stations 2-7 during 24 April-29 May 1985.

Mansfield et al. 1983). Because of their large size, the larvae we collected had probably hatched some months before. Auer (1982) reported that newly hatched deepwater sculpin have not been described, but that larvae 8.2 mm (not newly hatched) have been described. Some of our larvae were twice that size.

Fish Eggs

We collected fish eggs in many of the samples collected in the latter weeks of the study. None of these were lake herring or lake whitefish eggs, as they all were less than 2 mm, the minimum size of the eggs of these species. Many had distinctive stalks, a unique characteristic of rainbow smelt eggs. Rainbow smelt eggs are about 1 mm in diameter, which is the size of the eggs we collected.

Summer Drift and Biomass of Larval Fish

Larval fish drift was measured during the winter (none caught) and summer, when large numbers of mostly rainbow smelt were collected. A detailed discussion of larval fish drift can be found in the section entitled: RESULTS - DRIFT: BENTHOS, FISH LARVAE, FISH EGGS, AND MACROPHYTES - Seasonal and Transect Comparisons of Drift Densities - Fish Larvae. A brief discussion will ensue here. Rainbow smelt, (82%), burbot (0.6%), lake herring (0.1%), yellow perch and deepwater sculpin (<0.1%), and damaged and unidentified larvae (18%) made up the species collected during drift sampling. Rainbow smelt were mostly newly hatched, as larvae 4.5-6 mm made up over 90% of the catch (Fig. 22). Burbot larvae collected remained as small as those collected during our spring larval fish survey, about 4 mm (Fig. 22). However, a few larger burbot up to 6 mm were collected. Damaged larvae were also small, ranging from 3 to 6 mm (Fig. 22). We believe most of these larvae were damaged rainbow smelt.

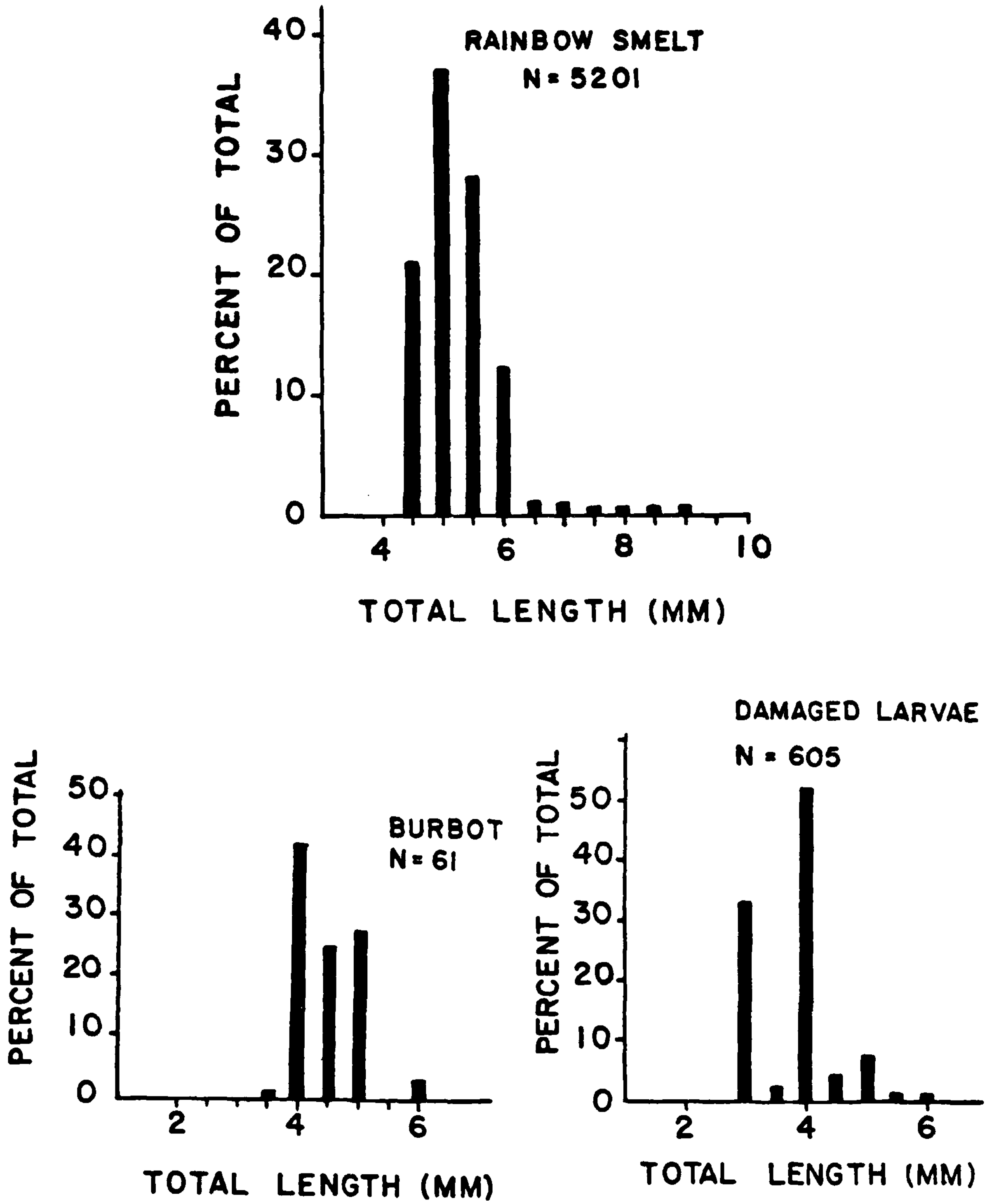


Figure 22. Length-frequency distribution of rainbow smelt, burbot, and damaged larvae collected from the St. Marys River during summer drift sampling, 1985.

DISCUSSION

MACROPHYTES

Macrophyte data show a strong relationship between the maximum depth at which these plants occur and the degree of penetration of light through the water, which is in agreement with the findings of Liston et al. (1985). The stations in the lower part of the river, such as Lake Munuscong and Raber Bay, have greater water turbidity and, therefore, shallower outer macrophyte boundaries. Not only is the water more turbid at these places than at upstream sites such as Izaak Walton Bay and Lake Nicolet, but also more variable in turbidity, as shown by the greater width of the confidence intervals for mean light extinction coefficient (Fig. 7). This point is also apparent from casual observation during our studies in the river, for much more spatial and temporal variations in water clarity were seen in the downstream portions than upstream. On one occasion, in the course of several hours while we sampled the plant transect at Raber Bay, a mass of turbid water gradually approached and engulfed the site. The increasing variability in water turbidity with distance downstream is probably related to greater contributions by tributary streams and rivers, which add great volumes of turbid water, particularly during periods of high runoff. There are very few major tributary streams emptying into the St. Marys River between Izaak Walton Bay and Lake Nicolet, but a number of important tributaries downstream.

Although water clarity is a determinant of the maximum depth at which aquatic macrophytes will grow, it is not the sole determinant of the location of the boundaries of plant beds. Sampling of plants along the 1-km transects showed that substrate characteristics also affected plant distribution. Plants were abundant on clayey substrates and much less so on sandy or gravelly bottoms. The large number of grab samples containing no plants in the east Lake Munuscong transect (Table 4) is due to the variable nature of the substrate in that area, which contained some large patches of sand.

Other, less obvious factors may also control the maximum depth of plant occurrence. For instance, in the course of searching for a site for the 1-km transect in Lake Nicolet, we investigated a deep "trench" in the area 2-4 km south of Wasig Bay. Despite the clay substrate and relatively transparent waters at this location, plants were not found growing at depths as great as at the place where the transect was eventually located, some 6 km to the south. The mac-ophyte beds also tended to be more patchy at the former site than at the latter. The reason for this difference is not readily apparent; further investigations may be warranted.

These observations suggest that any estimates of possible effects on submerged macrophyte beds in the St. Marys River resulting from natural or man-made perturbations must take into account not only possible changes in water turbidity, but also changes in the river bottom substrate. It would also be necessary to have more detailed data on the location, coverage, and depth of macrophyte beds along the length of the river prior to such perturbations to assess their effects.

BENTHIC DRIFT

Comparison with Previous Benthic Studies on the St. Marys River

Whole River Comparisons--

Direct comparison of whole river trend results of the present drift study with those of a survey of benthic density and diversity (Liston et al. 1983, 1985) are tenuous because of the time differential, locational differences within the river, and level of taxonomic detail. Nonetheless, some comparisons of whole river trends for percent composition of the benthos and drifting benthos are possible. The number of benthic taxa collected in Liston's benthos survey (162 taxa) was considerably greater than the 71 drifting benthic taxa. Much of this difference is due to generic identification of the Chironomidae in the benthos survey not afforded to the drift study. Of 14 drifting benthic taxa not encountered in the benthic surveys, most notable were *Mysis relicta*, *Pontoporeia hoyi*, Chaoboridae, and Psycodidae. Poe et al. (1980) also collected mysids and chaoborids in drift samples but not in benthic samples in the St. Marys River. With great likelihood, *M. relicta* and *P. hoyi* collected in the present study originate from Lake Superior and are only temporarily residents in the slower flowing, deeper portions of the river. Seagle et al. (1982) reported a preponderance of chaoborids in drift samples which were not present in the same proportion in benthic samples of the Illinois River. In this latter study, chaoborids were thought to originate from slow, backwater areas connected to the Illinois River, or from the river itself in areas of slow current. Chaoboridae, being collected only at Frechette Point, possibly occurs only in the upper, deeper, slow flowing portions of the river. However, there remains the strong possibility that the major reason chaoborids occurred only in Frechette Point drift samples is that chaoborids migrated up into the water column in slower, upstream water, possibly even backwater portions of the river, and were drawn or flushed into the fast flowing water above Frechette Point by currents and by their own nocturnal activity. Farther downstream where current velocities are considerably slower than at Frechette Point they likely resettle. This being the case, chaoborids probably inhabit the slower,

deeper portions of the entire river proper as well as connecting backwaters.

Psycodidae occurred only in a limited number of winter Frechette Point drift samples. Psycodids are known to inhabit quiet, very organically enriched waters (Hilsenhoff 1975). Absence of psycodids in benthic samples, coupled with a limited presence in drift samples, suggested the source of their occurrence may be external and not part of a sustained river supported population. A possible source may be an upstream sewage plant or factory input. This is suspected because concurrent with occurrence of psycodids, but not limited to samples in which psycodids occurred, was a clear, entangled, fibrous material. This material was the dominant component of all winter drift samples at Frechette Point and decreased substantially in a downstream direction.

The general lack of drift density differences across stations within each transect differed from benthic distribution patterns. Liston et al. (1985) found consistently greater benthic densities along the western, leeward side of the river than along the eastern, windward side. They attributed the difference to wave action scouring the bottom on the eastern side of the river. This trend was observed only at Frechette Point during the winter. None of the remaining transect station drift densities during either season exhibited this windward/leeward trend.

On a river-wide basis, Liston et al. (1985) reported only percent occurrence among samples collected. Agreement between percent occurrences for dominant taxa and between order of dominance within each survey was moderate at best. Percent occurrence for each taxon in benthic samples was greater than in drift samples (Table 44). While Chironomidae occurred in greatest frequency in both surveys, remaining orders of dominance differed considerably. Notable high percent occurrences in benthos samples but not in drift samples were recorded for Ceratopogonidae, *Hexagenia*, *Ephemera*, *Caenis*, *Polycentropus*, Polychaeta (*Manayunkia speciosa*), and *Mystacides*. Among present drift samples, notable high percent occurrences not observed among Liston's benthic samples included those for *Hydra*, Hydracarina, and *Mysis relicta*. Although percent occurrence differed between the two surveys, all major benthic survey taxa occurred in drift samples.

Comparisons at Frechette Point--

Based on Ponar grab samples from Frechette Point and Six Mile Point by Poe et al. (1980), estimated benthic density was 14,126/m^2; of 75 benthic taxa collected, 25% was Chironomidae,

Table 44. Comparisons of benthic and ichthyoplankton drift catches in the third 5-min period after the downbound passage (After 3) of the V.W. Scully (length = 223 m, width = 23 m, draft = 7.6 m) using 153-um nets at station 3 (3 m) at Frechette Point, St. Marys River, June 10, 1985. Mean density ($\bar{X}$, no./1000 m³) and percentage of total density (%T) for benthos and fish larvae based on pooling catches at each depth strata and over all depth strata. Included at the end of %T column are the number of benthic taxa and number of samples (N) collected. Densities rounded to nearest whole number. Percentages based on five significant figures and rounded to nearest tenth. Column summations subject to round-off errors.

Taxon	Downbound - After ship passage (3)					
	Mid-depth		Bottom depth		All depths	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Hydra	4056	56.7	2774	40.4	3415	48.7
Naididae	747	10.4	1990	28.9	1369	19.5
Ephemeroptera	0	0	121	1.8	60	0.9
Trichoptera	0	0	60	0.9	30	0.4
Chironomidae	2241	31.3	1809	26.3	2025	28.9
Total benthos	7151	-	6876	-	7013	-
No. of taxa		4		8		8
Rainbow smelt	427	100	181	100	304	100
Burbot	0	0	0	0	0	0
Damaged	0	0	0	0	0	0
Total fish larvae	427	-	181	-	304	-
N		2		2		4

23% Oligochaeta, 20% Gastropoda, 11% Pelecypoda, 7% Polychaeta, 3% Amphipoda, 1% each for Ephemeroptera and Trichoptera, and 10% miscellaneous. While mollusks were seldom collected in drift samples, percent composition of the 64 drifting benthic taxa was fairly similar to that of the bottom population. Chironomidae made up 31%, Naididae 9%, Trichoptera 3%, and Ephemeroptera 2% of the drifting benthos (Table 9). However, there remained a considerable difference between the benthos of the two studies, because in our drift study *Hydra* made up 49% and Chaoboridae 3% of the drift at Frechette Point.

Comparisons at Lake Nicolet--

Station II of Liston et al. (1985) corresponded to Lake Nicolet stations 1-5 in the present drift study. In Liston's study, the Chironomidae dominated (33-85%) benthic densities which ranged from $4800/m^2$ to $34,700/m^2$, excluding the navigation channel ($294-1750/m^2$ in the channel). Oligochaeta made up from <1% to 64% of benthic density. *Hyalella azteca* made up 10% of benthic abundance. Although Trichoptera and Ephemeroptera were represented by several taxa, neither were numerically important, except *Caenis* which at maximum made up 18% of benthic density. Polychaeta was occasionally numerically important, making up to 17% of benthic abundance.

By comparison, in our drift study, Chironomidae made up 42% of average summer benthic drift at Lake Nicolet. The second- and third-most abundant drifting benthos, Ephemeroptera (37%) and Trichoptera (9%) (Table 9), as well as presence of *M. relicta* differed considerably from benthic composition in Liston's study. Nonetheless, dominant, frequently occurring genera common to the benthos of each study were often the most frequently collected taxa in our drift study.

Comparisons at Point aux Frenes--

Station VII of Liston et al. (1985) corresponded with the Point aux Frenes transect in the present drift study. Benthic densities ranged from $1500/m^2$ to $29,900/m^2$ outside the navigation channel and $700/m^2$ to $2300/m^2$ within the channel. Chironomidae was the dominant benthic taxon (22-85% of benthic density), followed by Oligochaeta (6-80%). Liston et al. (1985) noted that benthic diversity was lowest at Point aux Frenes (55 taxa). This corresponded with results from our drift study in which a study minimum of only 25 benthic taxa were collected which were made up mostly of Hydracarira, Chironomidae, Ephemeroptera, and Corixidae in order of decreasing numerical importance. This order differed considerably from the order found by Liston et al. (1985) in the benthos.

Comparison with Previous Drift Studies on the St. Marys River

Direct comparison of station and transect benthic drift densities between the present study and those of Poe et al. (1980, 1982) is limited to Frechette Point. The Lake Nicolet and West Neebish transects of Poe et al. (1982) are not comparable to the present Lake Nicolet transect, because the former was located considerably northward near Six Mile Point at the upper end of Lake Nicolet and the latter was located somewhat southward in the West Neebish Channel. The present Lake Nicolet transect was located in the main body of water in lower Lake Nicolet between Poe's transects. For comparisons between the two studies, Poe's winter benthic drift densities were averaged for each station (1-3) at Frechette Point by pooling across the January 31, 1982 through March 9, 1982 samples periods during which the river was under ice cover. Poe's drift density during ice-free conditions was represented by the April 29, 1982 to May 1, 1982 sample period for stations 1-3 and for the navigation channel (station 4; only daytime samples collected). Average transect drift density was estimated by pooling across all station and sample dates for ice-covered and ice-free conditions, respectively, in the study of Poe et al. (1982). In our study, comparison of benthic drift density with that of Poe et al. (1980, 1982) was made by pooling in the same manner as above for stations 1-3 and for the navigation channel (station 4; Day 1 and Day 2 averaged) at Frechette Point. Comparisons between the two studies were based on drift collection by Poe using 571-µm-mesh nets and in our study, 355-µm-mesh nets.

Poe's 1982 winter average benthic drift density for stations 1-3 ranged from 43/1000 m^3 to 63/1000 m^3, with a transect mean of 47/1000 m^3. In 1985, similarly pooled estimates for stations 1-3 ranged from 680/1000 m^3 to 1216/1000 m^3, with a transect mean of 898/1000 m^3. In summer, Poe's station drift densities ranged from 42/1000 m^3 to 603/1000 m^3 and averaged 64/1000 m^3 in 1982. During our study in summer 1985, similar estimates ranged from 1456/1000 m^3 to 1884/1000 m^3 and averaged 1659/1000 m^3. In Poe's 1982 navigation channel samples, daytime benthic drift density averaged 183/1000 m^3 and decreased from surface (236/1000 m^3) to mid-depth (177/1000 m^3) to bottom (135/1000 m^3). In our 1985 navigation channel samples, daytime benthic drift density averaged 1844/1000 m^3 and increased from surface (721/1000 m^3) to mid-depth (1630/1000 m^3) to bottom (3183/1000 m^3). When the 1985 to 1982 ratios of pooled transect average (stations 1-3) densities were calculated, the 1985 winter, under-ice benthic drift densities were 1911% greater than in 1982; in ice-free conditions 1985 estimates were 2592% greater than 1982 estimates.

The same ratio for ice-free navigation channel estimates indicated 1985 surface (306%), mid-depth (921%), bottom (2358%), when averaged over all three water depth strata (1008%), were considerably greater than the 1982 estimates. While some of these differences may be attributable to annual variation and slight variations in seasonal sampling times, the primary factor influencing these differences is the mesh size employed.

The reversal of depth of maximum drift density in the water column between the present study and that of Poe et al. (1982) is unexplainable. However, similar studies on the Mississippi River have been inconclusive as well. Matter and Hopwood (1980) found a drift density difference between depth strata which was related to specific taxa. In their study, ephemeropterans were most numerous in the upper nets at night while trichopterans were most abundant in lower nets regardless of the diel period. Seagle et al. (1982) observed a similar trend for ephemeropterans and *Chaoborus* which were most numerous near the surface and for hydropsychid trichopterans which were most numerous near the bottom in both the Mississippi River and Illinois River. In another study on the Mississippi River, Eckblad et al. (1983) noted depth of maximum drift density varied with season. During June, drift was greatest near the bottom and was comprised largely of *Hydra*. However, during July, drift, largely Corixidae, was maximal near the surface. At Point aux Frenes in the present study, corixids increased in drift density in the summer but were most numerous near bottom (Table 14). In fact, nearly all taxa including Ephemeroptera and Chaoboridae occurred in greatest densities in bottom nets. The taxa least limited by water column depth was *M. relicta* which being a good swimmer, active migrater, and emigrating form from Lake Superior, is not limited by the shallow depths of the river. While results from the present study strongly indicated most drifting benthos occurred near bottom, seasonal factors may alter the observed pattern.

Some Factors Influencing Drift

Benthic Density and Production--

Several studies have reported no direct relationship between drift and benthic population composition, standing crop, or production (Elliott 1967; Morris et al. 1967; Bishop and Hynes 1969; Waters 1972). Nonetheless, some studies have shown that drift was density dependent (Muller 1954a; Waters 1961, 1962a; Pearson and Franklin 1968). Additionally, Waters (1972) speculated that drift may reflect excess production. Ghetti and Ravenetti (1984) reported a positive correlation between drift density and productivity, noting drift increased around emergence

periods. Although Pearson (1970) was able to demonstrate a good correlation between drift and production for a caddisfly, none could be shown for a co-occurring mayfly.

The discussion offered by Bishop and Hynes (1969) regarding drift, carrying capacity, and production perhaps best relates the interaction of these concepts. Density-dependent drift is least evident in streams which are subject to spates and severe disruption. In examples of density-dependent drift, amphipods and multivoltine ephemeropterans dominated the benthos. As a consequence, drift was influenced by the density of these invertebrates and their excess productivity. However, in streams experiencing spates or disruptions, carrying capacity is not attained. Subsequent drift results from behavioral activity and not from excess production. Regardless of these arguments, Bishop and Hynes (1969) concluded that the relationship between drift and production is "obscure".

In the St. Marys River, little is known empirically about its benthic carrying capacity. The only estimates of biomass and production are for 1-m and 3-m deep stations in lower Lake Nicolet during 1981 (Liston et al. 1983). At the 1-m station, average biomass was 6387 mg/m^2. Total annual production for common benthic taxa was 11,319 $mg/m^2/yr$. Production estimates in excess of 2000 $mg/m^2/yr$ included those for Chironomidae and Isopoda. At the 3-m station, average annual biomass in 1981 was 4550 mg/m^2. Total annual production was 10,704 $mg/m^2/yr$, with production estimates in excess of 2000 $mg/m^2/yr$ for Chironomidae and Amphipoda.

Biomass and production estimates from the St. Marys River provide little useful information beyond the immediate area and given the lack of clarity regarding the effect of biomass and production on drift, are of minimal use. Nonetheless, several of the more numerous and productive invertebrates did appear frequently in drift samples suggesting these factors should not be ignored. In addition to biomass and production, several other factors may exert a controlling influence on drift. Based on our understanding of these factors, they are interdependent to some degree and require simultaneous consideration.

Factors influencing drift affect benthic forms most inclined to drift which include in order of quantitative importance: Ephemeroptera, Simuliidae, Trichoptera, and Plecoptera (Waters 1972). The likelihood of each drifting is dependent upon life stage, current velocity, total discharge, temperature, light intensity (Elliott 1967; Bishop and Hynes 1969; Waters 1972), and in the present study, vessel traffic, and weather conditions. The latter two factors will be considered in a subsequent section.

Life Stage and Current Velocity--

Aquatic insects in later, larger life stages are the most likely individuals to drift (Waters 1972). One mechanism influencing drift of these individuals is a need for increased foraging areas, thereby subjecting them to increased exposure to currents, jostling of one another causing one or more to become dislodged, or movement into the water column for emergence (Mundie 1956; Bishop and Hynes 1969; Waters 1972; Bailey 1981; Morgan and Waddel 1981). Any or all of these life stage factors will be species specific with subsequent drift composition not adequately reflecting either the pre- or post-benthic population structure. Moderate agreement between drift and benthic compositions must certainly reflect these life stage factors and account for a portion of the difference observed.

A most notable disagreement between our drift study and the benthic studies of Poe et al. (1980) and Liston et al. (1985) was very frequent occurrence of *Hydra* and *Mysis relicta* in drift samples but not in benthos samples. However, *Hydra* did make up a large percentage of total benthic drift density in the high impact area at Frechette Point where Poe et al. (1980) sampled. Comparative occurrences of these two invertebrates suggest 1.) even though mysids are not easily caught by Ponars, they are very likely not long-term residents of the river, but rather originate in Lake Superior and are either transported to Lake Huron, consumed by fish, or die of natural causes before passing out of the river, and 2.) that *Hydra* occurred in substantive quantities upstream of Frechette Point, possibly on rocks and boulders, plants, and pilings and other man-made structures that were not or could not be sampled by usual benthic sampling devices. Greater drift densities of *Hydra* at Frechette Point relative to Lake Nicolet and Point aux Frenes suggested favorable, upstream current conditions enabling them to establish a large population which quite possibly preys heavily on zooplankton originating in Lake Superior.

Occurrence of large numbers of *Hydra* in the drift may be due to a force, such as current, causing dislodgement. Winter drift densities were lower than those in summer, and winter *Hydra* were larger sized (3-5 mm) than those in summer (<2 mm, many <1 mm). Large summer densities of small *Hydra* strongly indicated reproductive activity and dispersal of young to new areas of attachment. We conclude that occurrence of *Hydra* in the drift in the present survey was induced primarily by current in winter but largely by reproductive activity in summer over and above some residual level attributable to current.

With respect to remaining drifting benthic taxa, current velocity appeared to influence drift density. In contrast to

Hydra, remaining taxa are mobile and subject to contact with currents and subsequent entrance into the drift through their own movement. Consistently greater drift densities at Frechette Point relative to Lake Nicolet and Point aux Frenes were likely related to higher current velocities.

Total Discharge--

Little can be stated regarding the effect of total discharge on drift density in the St. Marys River as discharge is controlled at the locks and varied little over the course of the two time periods sampled. In smaller streams where most drift studies have been conducted, total discharge is often an overriding factor influencing increased drift due to flooding. While flooding was not a factor in our study, drift rates and intensities are related to discharge. Calculated drift intensities in our study are all well below maximal values reported by Waters (1972) who cited maximal drift intensities ranging from 2 x 10^6 to 3 x 10^6 in studies where all species were considered. Moreover, by substituting in the linear regression equation relating total discharge to invertebrate drift of Elliott (1970), we calculated a drift intensity of 27,681. If a range of ±50% about the 27,681-value is calculated (13,841-41,522), 37% of our values fall within this range, 21% were higher, and 42% were lower. To our knowledge, drift intensities have not been calculated for other large rivers, and given agreement between our values and those of Elliott (1970), even though his were based on streams, we feel assumptions inherent in our calculations and results obtained were reasonable. However, we acknowledge the differences between expected and calculated discharges and offer that more frequent measures would enhance future estimates of drift rates and drift intensities. At best, our estimates may be thought of as "ballpark" estimates.

When examining benthic drift density, drift rate, and drift intensity seasonal ratio differences among transects, the degree of seasonal change was greatest at Lake Nicolet when compared with Frechette Point (Tables 10-11). In addition, the degree of difference between these two transects decreased from winter to summer (Table 45). Common to Frechette Point and Lake Nicolet transects is a similar seasonal reproductive/behavioral activity of the benthic organisms. Differing between the transects is the physical structure of the river basin at each transect location which in turn affects current velocity. We speculate that while reproductive/behavioral activity of the benthos at Frechette Point increased during summer when compared with winter, the high current velocities observed during both seasons dampen seasonal differences to a greater degree at Frechette Point than at Lake Nicolet. At Lake Nicolet where seasonal ratio differences were considerably greater than at Frechette Point, we suspect that

reproductive/behavioral activity may be a more important factor influencing seasonal ratio differences than the effect of current velocities which were slow relative to those at Frechette Point. To express these relationships numerically, at Frechette Point, the constant, eroding effect of higher current velocities on the benthos allowed a three-fold increase due to seasonal reproductive/behavioral activity. At Lake Nicolet where the eroding effect of currents is less than at Frechette Point, there was a ten-fold increase in the drift ratios. We speculate most of the increase is due to activity of the organisms. However, some seasonal difference may be related to the type of organisms in the drift which in turn are influenced by the physical nature of the basins they encounter while drifting. A good comparison of this effect is between *Hydra* and *Mysis relicta*. While both animals drift through Frechette Point, the former was caught in our drift nets with much greater frequency at Frechette Point than the latter. However, at Lake Nicolet, mysids were retained in greater relative frequency than were *Hydra*. This difference is related to animal mobility and the influence of these two segments of the river on the animals. Neither animal is expected to be able to resettle in the high current velocity at Frechette Point. However, upon reaching the slower currents in Lake Nicolet, *Hydra*, being sessile animals, resettle slowly, and mysids, being highly mobile animals, resettle quickly. Regardless of time of day, but most particularly at night, mysids being active migraters reenter the the drift but *Hydra* do not unless disturbed or in a reproductive phase of their life cycle. Consequently, while both animals pass through Frechette Point and presumably accumulate in Lake Nicolet, mysids were more evident in drift nets than were *Hydra*. The effect of mysids accumulating in Lake Nicolet would be expected to be more evident in drift samples due to their active migratory nature than for *Hydra* due to slower currents. The same effect may occur at Point aux Frenes but evidently to a lesser degree based on our data. Accumulation of mysids in Lake Munuscong may be less intense owing to increased predation effects due to increased time spent in the river, siltation, temperature changes, or natural mortality. Additionally, the large, slow moving water mass in Lake Nicolet apparently provides an excellent nursery for fish which is not present at Frechette Point. We suspect the physical difference among transects contributes to benthic and larval fish drift differences among transects as they interact with the behavioral characteristics of a given taxon.

Water Temperature--

The effect of water temperature on drift within respective seasons was minimal, because water temperature differences between stations within transects and between transects were negligible. However, water temperature acting in concert with

Table 45. Winter and summer transect ratios for benthic and larval fish drift densities, rates, and intensities in the St. Marys River, 1985. FP = Frechette Point, LN = Lake Nicolet, and PAF = Point aux Frenes.

	Winter			Summer		
Transect ratio	Drift density	Drift rate	Drift intensity	Drift density	Drift rate	Drift intensity
Benthos						
FP/LN	9.84	17.3	26.5	2.71	5.22	5.50
FP/PAF	2.30	-	-	3.23	6.33	11.6
LN/PAF	2.33	-	-	1.19	1.21	2.12
Fish						
LN/FP	-	-	-	11.3	94.1	89.3
LN/PAF	-	-	-	72.7	38.2	66.8
PAF/FP	-	-	-	0.16	2.46	1.34

other factors considered in this section likely had a positive effect on seasonal drift differences. Water temperature directly affects development rates and physical conditions in the river, such as ice conditions. Waters (1962b) and Pearson and Franklin (1968) observed increased drift with increased water temperature. Muller (1954b) noted a decrease in drift at lower temperatures, and Waters (1962a, 1966, 1981) found low drift in the winter. Lower benthic densities in winter, decreased water temperature, and slower developmental rates in winter with their converse in summer, coupled with input of young, newly recruited individuals into the system, likely accounted for a substantial portion of seasonal differences observed in the present study.

Results of studies evaluating the effect of anchor-ice on drift vary. Anchor ice increased the amount of drift in the study of Bishop and Hynes (1969). Logan (1963) concluded that surface ice cover had no effect on benthic density except near the edges of the stream. With spring break-up, floating surface ice did not increase drift (Logan 1963). This conclusion agreed with that drawn by Poe et al. (1982) that floe ice did not increase drift density. Nevertheless, we postulate that there remains a possibility that ship passage under conditions of ice break-up may increase drift when there is considerable anchor-ice. This effect will most probably be most intense in slower flowing portions of the river where thicker ice develops and possibly, movement of nearshore ice blocks to offshore positions takes longer than in narrow portions of the river with higher current velocities. If the surging of water and ice chunks in shallow water due to ship passage is analogous to surging of ice blocks along the shoreline of Lake Michigan during ice break-up (Seibel et al. 1975), there exists a strong possibility that nearshore benthic drift where ice blocks might be expected to interact most with the bottom will be increased above that of natural ice break-up. However, as was evident during summer, the effect of wind on movement of ice blocks with subsequent nearshore scour may be a far more important force influencing additional drift than ship passage. Additionally, since shipping normally begins with ice break-up, neither the effect of shipping nor wind seem to have been detrimental to benthic populations. But in terms of factors potentially affecting drift, the scour of disturbed ice blocks on the bottom, regardless of the nature of the disturbance, is a factor which may increase drift of benthos.

Light Intensity--

The fact that benthic drift density is strongly dependent on light intensity has been reported by many investigators (Elliott 1967; Bishop and Hynes 1969; Waters 1972). Present results agreed well with the diel nature of drift activity, i.e., minimal drift diurnally and maximal drift nocturnally. Elliott (1967)

reported greatest drift just after sunset; the time when night samples were collected in the present study. While greatest diel drift density is species specific (Elliott 1970), barring catastrophic drift due to flooding or pollution, most drift results from behavioral activities (Bishop and Hynes 1969; Waters 1972). This brings the discussion full-circle to life stage, developmental factors. Increased drift at night is highly related to increased activity of invertebrates and to a lesser extent upon the carrying capacity of a particular stretch of river (Waters 1972).

The Fate of Drifting Benthos and the Effect of Weather and Vessel Traffic on Benthos

Fate of Drifting Benthos--

There remains the question of the fate of drifting benthos. As with mysids, drifting benthos inherent to the river may drift out of the river, be consumed by a predator, die of natural causes, or resettle downstream. Natural factors influencing downstream drift distance include current velocity, length of nocturnal period, activity of the individual [size, shape, density, center of gravity, swimming ability (McLay 1970)], water temperature, substrate type, unoccupied downstream areas, and availability of slow water areas (Bishop and Hynes 1969; McLay 1970; Elliott 1971; Waters 1972).

Poe et al. (1980) speculated that macroinvertebrates settle out of the water column quickly relative to the more buoyant and passive macrophytic material. Bishop and Hynes (1969) noted that drift distance of invertebrates is not very long due to thigmotactic and rheotactic responses. Waters (1972) observed that aquatic insects characteristic of swift streams reattach rapidly when released into the water column and concluded it seemed likely that they do not swim freely or drift for long distances.

McLay (1970) observed a range of downstream drift distances from 0.5 m to 19.3 m ($\bar{X}$ = 11 m). Elliott (1970) found the rate of return of drifting benthos to substrates was a decreasing exponential function which decreased with increased distance from the point of origin of an individual into the drift. Average drift distance was 20 m. Additionally, Elliott (1970) noted that Chironomidae, the most numerous drifting benthic form in the present study, resettled no more quickly than dead invertebrates. Nonetheless, 99% of them had resettled within 15 m in a current of 10 cm/s and within 91 m in a current of 60 cm/s (Elliott 1970). Although application of Elliott's findings to the St. Marys River which is a much larger and deeper river than the

stream studied by Elliott (16-40 cm deep, modal depth approximately 20 cm) may be erroneous, no other empirical methods for estimating drift distance exist. As a consequence, we have calculated a minimal resettling distance for Chironomidae in the St. Marys River using Elliott's equation values and assumptions. Due to the differences in river depths, we have also calculated an "adjusted drift distance".

At Frechette Point, average mid-depth navigation channel current velocity was 51 cm/s, which when substituted into Elliott's equation indicates 99% resettlement of drifting chironomids within 78 m in a stream of modal depth 20 cm. Based on these measures, the resettling rate for the average benthos located at mid-depth (10 cm) in Elliott's stream would be 0.13 cm/m (= 10 cm/78 m). This assumes a linear rate of decent through a column of water travelling at a constant current velocity and direction. This resettling rate is used to calculate the "adjusted drift distance" for the average chironomid located at mid-depth in the navigation channel at Frechette Point (4.5 m). For chironomids located at this depth in the navigation channel at Frechette Point, 99% resettlement would be expected to occur within 3462 m (= 450 cm/0.13 cm/m). The same organism located at mid-depth at the shallowest depth sampled (station 1 = 1 m) would have a 99% resettlement within 192 m based on an average current velocity of 26 cm/s and a resettlement rate of 0.26 cm/m. In a similar fashion, at Lake Nicolet the "adjusted drift distance" at mid-depth in the upbound navigation channel is 1440 m, while that of the downbound channel is 1710 m. At Point aux Frenes, the "adjusted drift distance" at mid-depth in the navigation channel is 1350 m. At the shallowest stations sampled nearest these three channel locations, the "adjusted drift distances" are 35 m, 75 m, and 60 m, respectively. From these calculations, we project 99% resettlement of the main component of mid-depth, drifting Chironomidae within 60 m in the nearshore to approximately 3500 m in the navigation channel. Occurrence of faster or slower current velocities downstream will enhance or impede drift distance. However, based on these estimates, drift originating at mid-depth or bottom at any transect would likely resettle downstream prior to attaining the "adjusted drift distance" due to occurrence of slower water below each transect.

The exception to this may be those individuals occurring at the surface of the navigation channel. Expected drift distances for these individuals are 6000 m at Frechette Point, 3103 m in the downbound channel at Lake Nicolet, 2727 m in the upbound channel at Lake Nicolet, and 2647 m at Point aux Frenes. In these cases, as with those above, drift distances are anticipated to be shorter than calculated due to current variations.

The more passive portions of the drift, such as macrophytic material, are expected to resettle in slower, downstream portions of the river. Although Poe et al. (1980, 1982) speculated this material may be removed from the system upon being disturbed, we suspect it may be transported downstream to resettle in slow water areas (particularly Lake Nicolet and Lake Munuscong), and thereby, reassume its role in the river's production ecology cycle. While some may be lost from the lower reaches of the river, we suspect this is insignificant relative to the whole river and would not anticipate this altering benthic production negatively.

Once suspended in the water column organisms become easier prey for fish. The degree to which drifting benthos are utilized as a food by fish varies with the size and species of fish (Waters 1972). Selective feeding on drifting benthos occurs, particularly among young salmonids. However, this changes considerably as these fish get larger (Waters 1972). Waters (1972) concluded in general that fish are "opportunists" which often, but not always, consume drifting benthos.

Our speculation regarding the fate of drifting benthos in the St. Marys River is that a great proportion of the macroinvertebrates resettle within a short distance and that a small fraction are consumed or destroyed by drifting activity. Mysids may drift through the entire river system, but few other benthos would be expected to do the same. The majority of drifting *Hydra* probably perish or fair poorly when drifting from the northern portions of the river into Lake Nicolet unless by happenstance they resettle in suitable areas. Most other drifting benthos are capable of movement and reenter the drift to find suitable habitat.

Effects of Weather and Vessel Traffic on Drift--

Studies on the effect of ship passage on benthic drift are few and results are contradictory and seem to be dependent upon circumstances particular to each study. Herricks (1981) observed increased benthic drift following barge passage during low flow but not during high flow periods in the Mississippi River. Seagle and Zumwalt (1981) observed no increases in drift density due to "tow" passage in the Mississippi River, but attributed this to the confounding effect of high flow. Eckblad (1981) also demonstrated no significant increase in drift due to "tow" passage in the Mississippi River. However, northbound (supposedly upbound) "tows" in the Mississippi River increased drift at a 3-m sampling depth (Eckblad 1981). In addition, Eckblad (1981) noted that 9% of the benthos attached to rock surfaces were dislodged with increased current velocity. However, Seagle and Zumwalt (1981) observed no such trend.

The inability of the two ship passage studies in the present study to demonstrate detectable increases in the density of drifting benthos or fish larvae was very probably related to the overriding effect of windy weather conditions. Based on visual observations, greatest impact on drifting benthic densities are expected to occur during upbound passage of vessels. We suspect this is due to the vessel plowing through the river and deflecting large volumes of oppositely flowing water slightly upstream and laterally, whereby it rushes downstream at a greater velocity than the ambient current velocity of the river. This process is a very dynamic one that eventually evens out the disturbance to reestablish the "normal" flow of the river at some equilibrium level. Downstream vessel passage apparently does not present such an extreme displacement of water at least in part because the ship and the water it is displacing are traversing the same direction. In fact, we observed a decrease in current velocity with downstream passage but an increase during upbound passage. This same trend was also observed by Eckblad (1981) in the upper Mississippi River. In either case, but especially for upbound ships, passage is expected to have a greater effect on increasing benthic drift depending on the speed and the size of the ship (Bhowmik et al. 1981). Under windy conditions which we measured the effect of ship passage, no increase in drift density was observed. In a trial run of this experiment in calm weather during May 1985 at Frechette Point, we observed considerable disturbance of the bottom with increased turbidity during passage of an upbound vessel. Based on these observations, we conclude that there remains yet an unproven but highly probable increase in drift components with passage of an upbound vessel during calm weather conditions. However, during windy weather, the added effect of ship passage was undetectable and did not significantly alter an already disturbed system.

Drift induced by windy weather conditions and by ship passage during ice-free, calm weather conditions represent examples of quasi-catastrophic drift. It is difficult to ascertain the ultimate effect on the benthos of either and that effect very likely depends upon factors unique to each portion of the affected river bottom. However, we feel that drift induced by windy-weather conditions has a greater overall, river-wide effect on drift than individual, though frequent, ice-free ship passages. In the most clear case of an effect due to weather, benthic drift density at Frechette Point which should have been greatest nocturnally was highest during the day. We feel this difference was due to windy conditions during the day and calm conditions during the night. This is a remarkable difference, because it suggests that wind intensity and direction is capable of exerting a greater controlling influence on drift than is light intensity. In addition to drift density differences, current velocities were greater during windy conditions than during calm conditions. This concurred with the conclusions

drawn by the Great Lakes Hydraulics and Hydrology Branch of the U.S. Army Corps of Engineers who concluded that wind speed and direction influenced surface and probably subsurface flow of the St. Marys River (U.S. Army Corps of Engineers 1984). Similar results were observed during the larval fish surveys.

Wind-induced drift is expected to be river-wide, aside from sheltered areas. By contrast, ship-induced drift is pulsed by frequency of ship passage. In either case, induced drifting organisms will resettle, but we suspect, they will do so more rapidly when induced by ship passage than by wind. More rapid resettlement of ship-induced drift is expected because the disturbance generated by a ship passage is short-lived and that caused by weather events may last for days or possibly weeks. In our 2-wk sample period in early June it was windy during daylight hours for all but 2 days.

If during calm conditions there are pulses of ship-induced drift, there remains the possibility that these "clouds" of drift may provide an unexpected food source for fish predators. In this fashion, ship-induced drift may add to the mortality of benthos populations in the river. However, we hypothesize that the effect of weather during ice-free conditions far exceeds normal ship passage effects on drift. Given the observed ability of river benthic and larval fish populations to maintain adequate productivity, we expect no adverse effect on these populations due to normal ship passage operations during ice-free conditions. Consequently, any loss of benthos attributable to normal shipping activity during the base shipping season of 1 April to 15 December is in all likelihood easily sustainable by the benthic population indigenous to the river.

Addressing the potential effect of ship passage on benthic populations in the river during winter, ice-cover conditions is much more difficult to answer. The primary reason is the lack of data. Poe et al. (1980, 1982) concluded with their ship passage, under-ice drift data (the only data available) that there was a considerable increase in benthic drift density. This conclusion can not be overlooked and should be impetus for further investigation and analysis. However, re-analysis of the Poe et al. (1980) benthic drift data suggests vessel passage under conditions of ice-cover may result in a pulsed increase in benthic drift density (15-16 February 1979), while at other times (13-14, 17-18 March 1979) displaying little apparent effect. These variations leave open the solution to the effect of under-ice shipping effects and lead us to further speculation.

Based upon our knowledge of drift, we would not expect ship-induced drifting benthos to drift greater distances before resettling than during summer, thereby not causing any increased detrimental effect on existing populations. Most fish predators

during winter are expected to be larger than during summer, probably located in deeper water, more lethargic, seldom feeding, and not relying heavily on drifting benthos as a food source. This being the case, predation may not be severe on a sudden pulse of drift moving downstream. However, we are concerned as were Poe et al. (1980, 1982) about any additional loss to benthic populations at a time when numbers and productivity are minimal and about alteration or loss of preferred habitat due to physical disturbance of the river bottom. Benthic invertebrates which may be negatively affected include those capturing food by constructing nets or having a filtering apparatus, e.g., Hydropsychidae, some Chironomidae, Simuliidae, and Pelecypoda. Ephemeroptera may be negatively affected by increased siltation or sediment disturbances through fouling of gills and possibly loss of preferred habitat. Taxa which graze on algal growth on rocks or collect detrital material, e.g., many Trichoptera, Gastropoda, and many Chironomidae, may find those resources altered by physical disturbance of the river bottom. Alteration of habitat and particularly food resources during conditions of ice cover are important, because in winter the river is a much more static, fixed system than after ice break-up. When ice breaks up, benthic food resources increase, e.g., there is increased production of aquatic macrophytes and algae, and increased input of allochthonous material due to spring melt and rains, making any alterations less restrictive.

Whether the benthos can support continued and frequent under-ice disturbances has yet to be demonstrated. Given that there was shipping under conditions of ice cover from 1977 through 1979 (personal communication; Don Williams, U.S. Army Corps of Engineers, Detroit District) and the benthos of the river apparently have been capable of maintaining reasonable benthic densities and productivity rates in the areas and seasons studied, this suggests the effect of shipping has been minimal. However, the variable results observed by Poe et al. (1980) and the concerns expressed herein remain to be addressed empirically. The data of Poe et al. (1980) do not seem adequate to answer whether the apparent ship-induced pulse of drift evident in their data would continue to be evident with additional ship passages or would level off at some equilibrium level. Regardless of which occurs, the impact of either on the benthos in high impact areas and possibly in low impact areas remains to be determined. Our speculation that previous shipping did not appear to detrimentally affect the benthos during ensuing years is not sufficient to forecast the future. The frequency of ship passage may vary from year to year and the fate and importance of induced drift losses remain unknown. This is particularly important to the cohort surviving from the previous reproductive period. Typically, in mid-winter and early spring this cohort will be at a numerical minimum. Finally, reproductive success of the benthos varies from year to year based on many factors but

possibly foremost may be weather for taxa which have flying adults, e.g., Ephemeroptera, Trichoptera, and Diptera. Poor weather conditions at critical times, coupled with any potential additional loss attributable to ship passage may be important to survivability of some taxa.

ZOOPLANKTON

Zooplankton Abundance and Community Structure

The St. Marys River was characterized by low zooplankton densities, both in February (winter) and early June (spring), averaging 313.2/m³ and 93.7/m³ respectively for #2-mesh net collections. For #10-mesh net collections, these averages were 636.2/m³ and 421.3/m³, respectively. In contrast, Selgeby (1975) reported that, in the outflow from Lake Superior, February zooplankton densities averaged approximately 2,000/m³ while early June densities averaged approximately 1,000/m³; his collections were made using a #10-mesh net.

Low zooplankton densities in our study appear to be due to several factors. First, most collections were made with a relatively coarse (355-µm) #2-mesh net which undersampled all but the largest zooplankton. Evans and Sell (1985) determined that a #2-mesh net probably provides representative abundance estimates only for the largest zooplankton, i.e., *Limnocalanus macrurus* copepodites and possibly *Daphnia*. Immature *Cyclops* and *Diaptomus* copepodite abundances are severely underestimated by a #2-mesh net by at least one order of magnitude. Since zooplankton community structure in the St. Marys River varied seasonally and spatially, such underestimates were not constant over the study. For example, the St. Marys River zooplankton community was dominated by larger zooplankton in winter than spring (this study; Selgeby 1975). Furthermore, during June, zooplankton community structure varied along the length of the river with smaller-bodied zooplankton dominating at Lake Munuscong while larger-bodied zooplankton were dominants at Frechette Point and Lake Nicolet.

A second factor which may have affected zooplankton abundance was the sampling method. Plankton nets were suspended in the river and zooplankton were collected as water flowed through the net. Current velocities were low, averaging 18.1 cm/sec in February and 20.8 cm/sec in June. In contrast, towing speeds commonly used in zooplankton studies average 50 to 100 cm/sec. These high towing speeds are necessary to minimize net avoidance, especially by the larger zooplankton. In this study, it is highly probable that a significant fraction of the zooplankton community was able to avoid capture by the suspended

nets, especially in areas where flow velocities were low. This may account for the fact that zooplankton generally tended to occur in highest densities in the channels, especially in surface waters, where current velocities were highest. This may also account for the greater densities of zooplankton in day versus night collections made in June at Frechette Point and Lake Nicolet.

There are two possible implications to sampling biases in zooplankton population estimates. First, seston (zooplankton and detritus) concentrations may have been underestimated: similarly, the relative contribution of detritus to total seston may have been overestimated. These errors probably varied with temporal and spatial changes in zooplankton community structure and current velocity. Second, if net avoidance was a significant factor affecting zooplankton abundances, it may also have been a significant factor affecting abundance estimates of other organisms. For example, fish larvae abundances probably were underestimated. The mean size of larvae collected in the drift samples averaged only 11.9 µg. Benthic abundances may also have been underestimated, especially the highly motile *Mysis relicta*.

One intriguing aspect of the zooplankton study was the decline in zooplankton abundances at Lake Munuscong during winter and spring, and the decrease in mean animal size in June. The decline in abundance was most pronounced in June. Since current velocities at Lake Munuscong were higher than at Lake Nicolet, flow velocity through the plankton net does not appear to be an important factor. Possible important factors affecting the loss of zooplankton (especially larger-bodied animals) are mechanical damage in the turbulent river waters and predation by size-selective planktivorous fish.

Although most of the zooplankton community probably originated in Lake Superior (especially in winter), there were two other sources of animals. Small rivers and streams probably contributed to the St. Marys River zooplankton community. This was most evident at Frechette Point where a *Daphnia* morph, *D. minnehaha* was collected in low numbers in June at stations 2 and 3. A second probable source of zooplankton was the littoral and epibenthic regions of the St. Marys River, especially in summer. The epibenthic and littoral community appeared to be especially well developed at Lake Munuscong in summer where there were large day-night, depth strata, and location (channel versus shallow) differences in mean animal size.

It is not clear whether or not an extension of the winter navigation season would have any effect on the zooplankton community. Although zooplankton abundances varied significantly along the course of the river, across the river, with depth, and with current velocity, the study was not designed to provide

information on the causal factors. Thus it would be premature to speculate on what effects a potential increase in current velocity and resuspension (associated with an extended winter navigation season) may have on the zooplankton community along the course of the river.

Biomass

The biomass studies show the variable nature of river load. During winter, when the river was ice-covered, zooplankton were the major component of river flow (an average of 63.2% on a dry-weight basis). The second-most abundant component was detritus. The mean %AFW:seston was low (4.8%), approximating the mean measured value for benthos, mysids, and fish. This suggests that the detrital component of seston was comprised largely of organic matter, e.g., plant fragments. In contrast, during the June study, zooplankton was a smaller component of river load (9.4%) with detritus predominating (86.9%). This occurred primarily due to a 5-fold increase in detritus biomass. The mean %AFW:seston also increased to 25.6% suggesting that inorganic matter (various mineral particles) and refractile organic matter increased in concentration.

The June increase in detritus concentration and %AFW:seston could have been due to two factors. First, as flow velocities of small rivers and streams increased with spring snowmelt, increased amounts of terrigenous material may have entered the St. Marys River. Second, as the river lost its protective ice cover, heavier sedimentary particles (with a higher %AFW:sediment value) were more readily resuspended from the river floor as wind-driven wave activity intensified. Such wave activity could explain why detritus accounted for a larger percentage of the June river load at Lake Munuscong (98.7%) than Lake Nicolet (40.6%), although there were only small differences in current speed (17.1 cm/sec versus 13.9 cm/sec) between the two locations. Conditions generally were windy at the Lake Munuscong site but were calm at Lake Nicolet. Similarly, current velocities were higher at Lake Nicolet during winter (18.9 cm/sec) than spring (13.9 cm/sec), and detritus accounted for a smaller percentage of the total river load (27.0% versus 40.6%). The mean %AFW:seston was lower in winter (3.8%) at this site under ice cover than in spring (24.6%) when ice cover had been lost. Current velocities apparently increased under windy conditions. For example, at Lake Munuscong, June current velocities averaged 17.1 cm/sec versus 4.0 cm/sec in winter. The June study was conducted during windy conditions. In contrast, differences in winter-spring current velocities were less at Frechette Point and Lake Nicolet; at these sites, June studies were conducted during calm or calm to windy conditions.

The results of this study suggest that if an extended winter shipping season resulted in a substantial loss of protective ice cover, one possible consequence would be a change in the nature of river load. It is possible that river load would increase as heavier sedimentary matter became more readily resuspended from the river floor. Furthermore, current velocities could increase under windy conditions. This potentially could affect the benthic and fish community, including overwintering eggs.

Benthos was generally a minor component of total river load. Unlike zooplankton, benthic drift (in terms of biomass) was not greater in the more rapidly flowing channel areas than in shallow regions. Benthic drift apparently was not higher in surface and mid-depth strata where current velocities were high when contrasted with bottom waters where current velocities were less. In many instances, there were significant day-night differences in benthos biomass (all winter comparisons; June Lake Nicolet and Lake Munuscong comparisons) suggesting that benthic organisms were able to retain their desired position in the water column over a 24-hour period. A possible exception was Frechette Point in June when current velocities may have been sufficiently high (38.4 cm/sec) to prevent the benthos from migrating down to the sediments during daylight hours. At all other locations and times, current velocities apparently were not sufficiently high to prevent benthic organisms from returning to the sediments following sunrise.

Plants were minor components of river load, especially in winter. The distribution of plant fragments within the river was highly patchy with many samples containing no material and a few samples containing relatively large amounts of vegetation. Plants were most abundant at Frechette Point although the reason for this was not determined. Possibly there were greater standing stocks of plants upriver of Frechette Point. The effects of an extended winter shipping season on plants is unknown. Assuming that there was greater wave activity in the absence of ice cover, greater amounts of plant material could appear in the river load. This may or may not be beneficial to the river ecosystem. An increase in plant fragments potentially could benefit the benthic community (by supplying increased organic matter) although, if fragmentation were severe, the overwintering plant community could be harmed.

Fish larvae were minor components of river load. It is probable that fish larvae biomass may have been underestimated by the sampling method used. Since fish larvae were not collected during winter, increased winter shipping should not have an effect on larval fish distributions at that time. However, as stated earlier, overwintering demersal eggs and pelagic juveniles and adults may be adversely affected by increased resuspension of detrital and mineral matter.

FISH LARVAE

Lake Herring

Historical and current evidence shows that lake herring spawn in the St. Marys River (Behmer et al. 1980; Goodyear et al. 1982; Liston et al. 1983, 1985). Newly hatched lake herring larvae that we collected established that spawning occurred in 1985. Certainly, suitable depths and bottom types are available in the river system. The scarcity of larvae in the Edison Hydropower Canal suggests that Lake Superior was not a major source.

Lake herring hatching usually begins from 1 to 6 days and peaks from 5 to 20 days after ice break-up (Colby and Brooke 1973; Cucin and Faber 1985). We estimate that ice break-up occurred around 20-22 April 1985 on the St. Marys River. Since we began sampling on 26 April, our collections should have covered the peak hatching period. Our results and those of Liston et al. (1983, 1985) generally show peak larval fish densities during the first 3 sampling wk after ice break-up. However, no distinct hatching peak, that is, a consistently maximum catch at all or most stations during only one sampling week, occurred. These findings suggest that either the hatching peak was missed or the sampling sites were not located near very productive spawning sites. We believe the latter reason. However, the former cannot be dismissed totally. John and Hasler (1956) found that increased light and agitation stimulate the movement of lake herring embryos which accelerates larval emergence. Hatchery-reared eggs subjected to continuous illumination hatched 7 to 8 days earlier than eggs held in darkness. When kept in hatchery trays in a calm water bath, eggs that were ready to hatch were induced to hatch almost instantly by agitating the tray for a moment; when not disturbed, the eggs remained unhatched for several additional days (exact number not given) (John and Hasler 1956). Since ship traffic in the St. Marys River begins before the river is completely ice free, we can hypothesize that the agitation caused by ship passages and the increased illumination from the break-up of channel ice could cause early emergence of lake herring from eggs laid near the shipping channel. In addition, there is one reported incidence, over 2 yr, of lake herring emergence 4 to 5 wk before ice break-up in an Ontario lake (see Cucin and Faber 1985: page 24).

Compared with peak densities of some spring-hatched species, the production of lake herring larvae in the St. Marys River appears to be moderate (Table 43). Densities of rainbow smelt and yellow perch were substantially greater than lake herring. However, densities of lake herring in the St. Marys River are similar to larval fish densities in productive areas of Lake

Superior (Selgeby et al. 1978) and Lake Huron (Loftus 1979a, 1979b, 1982). Maximum densities from these three water bodies were in the same order of magnitude. Liston et al. (1985) concluded that lake herring is an abundant species which supports a major sport fishery in the St. Marys River. Goodyear et al. (1982) reported that lake herring spawn in the river, but no information was given on the magnitude of this reproduction.

Since lake herring are pelagic spawners, and the slightly adhesive eggs are deposited in shallow depths over no particular bottom type (Smith 1956; Colby and Brooke 1973; Scott and Crossman 1973; Cucin and Faber 1985), the newly hatched larvae tend to be widely distributed (Cucin and Faber 1985). Consequently there may be no major spawning area (that is, an area where intensive spawning occurs) in the St. Marys River.

Regarding larval fish production among the six river stations, East Neebish Island (station 6) appeared to be the most productive. Moderate spawning must have occurred in this area. Some spawning apparently occurred at north Lake Nicolet and north Lake Munuscong (stations 2 and 7). Liston et al. (1985) collected moderate numbers of lake herring larvae at these two stations. Stations 2, 6, and 7 are all near small islands which may play a role in lake herring spawning or larval fish behavior. The remaining three stations in Lake Nicolet appear unimportant regarding lake herring reproduction. Larvae may have emigrated into these three stations after emerging elsewhere. Lake herring larvae are positively phototactic during the first few days after hatching and swim toward the surface. They then move to shallow inshore areas (Cucin and Faber 1985).

Lake Whitefish

Historically, lake whitefish spawned in the St. Marys River (Goodyear et al. 1982). Lake whitefish spawn in shallow depths, usually over sand, gravel, and rocks (Scott and Crossman 1973). Certainly, this type of habitat is available in the St. Marys River. Although currently some spawning occurs in the river (Goodyear et al. 1982), the importance of this spawning appears to have diminished in recent years (Liston et al. 1985). Liston et al. (1985) did not consider lake whitefish to be an abundant species in the river. However, densities of larvae that we and Liston et al. (1985) found in the river are similar in magnitude to densities reported from productive areas of Lake Huron (Loftus 1979a; 1979b; 1982).

The data on the number of lake whitefish and lake herring caught per week and the percentages of larvae that contained yolk showed two regular patterns that would be expected for larval fish that are residents of the St. Marys River system. First,

the number collected declined in a regular fashion over the period of the study. We attributed this to natural mortality of larvae which is sometimes high during the first few days and weeks of their lives when it is critical that they obtain food. Second, as larval fish grow older they develop more fins and greater agility which helps them to avoid plankton nets towed in their environment. Since no lake whitefish and very few lake herring larvae passed through the Edison Hydropower Canal (station 1) during any given week's sampling, we concluded that the contribution from Izaak Walton Bay and Lake Superior to the St. Marys River population was very small. However, in 1983, Liston et al. (1985) found the greatest densities of lake whitefish larvae were at their Lake Superior station (near Izaak Walton Bay) compared with six other stations below the St. Marys Rapids. Densities in 1982 were much lower at this station than in 1983. Thus, in some years, lake whitefish production can be substantial in the Lake Superior area of the river. We would expect lake herring and lake whitefish to hatch some days later in the Lake Superior area than in the St. Marys River, where water should heat faster and ice break up (cues for hatching) sooner than in Lake Superior. However, lake herring larvae caught in the Hydropower Canal entering the river from Lake Superior were low in abundance over the entire 6-wk period, and we collected no lake whitefish larvae in the canal.

Our data establish the St. Marys River as a spawning and nursery area for lake herring and lake whitefish. Larval fish densities of both species were similar in magnitude to densities reported from Lake Huron and Lake Superior. However, the importance of this reproduction to the river populations remains unanswered. One aspect of this question might be answered by sampling in an area away from the channelized portion of the river. The area around the north side of St. Joseph Island appears, at least from physical maps, to have suitable areas for coregonine spawning and, presumably, has not been disturbed by either dredging or large ship traffic. Densities of larval lake herring and lake whitefish in this relatively undisturbed area could be compared with those in the river where peak densities occurred in the past.

Impacts of Winter Navigation on Fish

The impact on fish of the proposed extension of winter navigation past the normal closing date of 15 December must be examined in light of the life history of each of the important species that inhabit and reproduce in the area. Lake herring and lake whitefish spawn in the fall, usually over rocky, shallow areas during November or early December. One of the critical periods in the reproductive phase occurs just after fertilization and water hardening of the eggs. If eggs are subjected to

increased agitation during this critical period, increased mortality can result. Since ship passages already occur over the spawning period, this potential impact has existed for many years. Another critical period for the St. Marys River coregonids is hatching in the spring. Lake herring eggs begin hatching from 1 to several days after ice break-up (Colby and Brooke 1973; Cucin and Faber 1985). There is also evidence that increased light and agitation can speed up larval emergence (John and Hasler 1956). If ice break-up in the St. Marys River occurs prematurely because of ship traffic in the spring, timing of lake herring emergence and seasonal production of its zooplankton and rotifer food may be mis-matched. Increased mortality of coregonid larvae could be the end result. So in the spring the potential for damage already exists as the navigation season usually opens on 1 April. Ice broken up early by ship traffic may cause early emergence of lake herring larvae and presumably lake whitefish. There is evidence (see Cucin and Faber 1985) of lake herring hatching under the ice on two occasions in an Ontario lake. However, there was only this one reported incident; all other studies show hatching just after ice break-up (John and Hasler 1956; Colby and Brooke 1973; Scott and Crossman 1973; Cucin and Faber 1985).

Another species which has the potential to be impacted by winter navigation is the burbot. The burbot spawns from December to April (Auer 1982), mostly during the winter and sometimes under ice in shallow water over sand or gravel shoals. Eggs are semibuoyant and scattered randomly over the substrate (Auer 1982). Our larval burbot data indicate that adults spawned over a prolonged period or that eggs were deposited in habitats varying greatly in water temperature. We collected larval burbot in moderate abundances and of the same newly hatched size in each of the 6 wk of the study. Since eggs of the burbot are semibuoyant, there is considerable potential for their movement from optimal spawning substrate because of the currents and waves generated by ship passage in the St. Marys River. Apparently this impact was not extremely detrimental as moderate numbers of burbot eggs hatched over the entire 6 wk of the study.

Resuspension of sediments may be an important impact on overwintering fish eggs. The surge caused by ship passage in winter may resuspend fine sediments which could resettle on the eggs. Suffocation of the embryos would result in increased mortality for all three species.

If extension of the shipping season results in substantial ice breaking activity, another impact on overwintering eggs could occur. Channel ice pushed into shallow areas could scour the bottom. Overwintering coregonid and burbot eggs may be crushed, dislodged, or moved to unsuitable habitats.

Another possible effect on lake herring, lake whitefish, and burbot reproduction is the possible dislodgement of spawned eggs from the spawning substrate by the surge from ship passages. However if the fish are spawning on optimal substrates, some eggs should be deposited deep in the interstices of rocks, water harden and expand there, and be subject to very little dislodgement due to current and waves caused naturally or by ship passage.

LITERATURE CITED

Auer, N.A. (ed.) 1982. Identification of larval fishes of the Great Lakes Basin with emphasis on the Lake Michigan drainage. Great Lakes Fish. Comm. Spec. Pub. 82-3. Ann Arbor, MI. 744 pp.

Bailey, P.C.E. 1981. Insect drift in Condor Creek, Australian capital territory. Aust. J. Mar. Freshwater Res. 32:111-120.

Behmer, D.J., G.R. Gleason, and T. Gorenflo. 1980. Identification and evaluation of lake whitefish and herring spawning grounds in the St. Marys River area. Lake Superior State College, Sault Ste. Marie, MI. 29 pp.

Bhomik, N.G., J.R. Adams, A.P. Bonini, C. Guo, D. Kisser, and M. Sexton. 1981. Resuspension and lateral movement of sediment by tow traffic on the Upper Mississippi and Illinois rivers. Rept. for the Env. Work Team. Upper Miss. Riv. Basin Comm. Master Plan, Minn., MN. 111 pp.

Bishop, J.E. and H.B.N. Hynes. 1969. Downstream drift of the invertebrates ina stream ecosystem. Arch. Hydrobiol. 66:56-90.

Ciborowski, J.J.H. 1983. Influence of current velocity, density, and detritus on drift of two mayfly species (Ephemeroptera). Can. J. Zool. 61:119-125.

Colby, P.J., and L.T. Brooke. 1973. Effects of temperature on embryonic development of lake herring (*Coregonus artedii*). J. Fish. Res. Board Can. 30:799-810.

Cucin, D., and D.J. Faber. 1985. Early life studies of lake whitefish (*Coregonus clupeaformis*), cisco (*Coregonus artedii*) and yellow perch (*Perca flavescens*) in Lake Opeongo, Ontario. Ontario Fish. Tech. Rep. Ser. No. 16. 28 pp.

Eckblad, J.W. 1981. Baseline studies and impacts on navigation on the benthos and drift, on the quantity of flow to side channels and on the suspended matter entering side channels of Pool 9 of the Upper Mississippi River. Rept. for the Env. Work Team, Upper Miss. Riv. Basin Comm. Master Plan, Minn, MN. 148 pp.

Eckblad, J.W. and C.S. Volden. 1984. Allochthonous drift from backwaters to the main channel of the Mississippi River. Amer. Midl. Nat. 111:16-22.

Elliott, J.M. 1967. Invertebrate drift in a Dartmoor stream. Arch. Hydrobiol. 63:202-237.

Elliott, J.M. 1970. Methods of sampling invertebrate drift in running water. Ann. Limnol. 6:133-159.

Elliott, J.M. 1971. The distances travelled by drifting invertebrates in a Lake District stream. Oecologia 6:350-379.

Evans, M.S., and D.W. Sell. 1985. Mesh size and collection characteristics of 50-cm diameter conical plankton nets. Hydrobiologia 122:97-194.

Fassett, N.C. 1957. A manual of aquatic plants. Univ. Wis. Press, Madison, Wisc.

Ghetti, P.F. and U. Ravanetti. 1984. The drift over one year of Plecoptera and Ephemeroptera in a small stream in northern Italy. Arch. Hydrobiol. 99:478-488.

Goodyear, C.D., T.A. Edsall, D.M. Ormsby Dempsey, G.D. Moss, and P.E. Polanski. 1982. Atlas of the spawning and nursery areas of Great Lakes fishes. Vol. 3: St. Marys River. U.S. Fish and Wildl. Serv., Washington, D.C. FWS/OBS-82/52.

Herricks, E.E. 1981. Effects of barge passage on physical, chemical and biological conditions in the navigation reach of the KasKaskia River. Rept. for the Env. Work Team, Upper Miss. Riv. Basin Comm. Master Plan, Minn., MN. 98 pp.

Hilsenhoff, W.L. 1975. Aquatic insects of Wisconsin. Tech. Bull. No. 89. Dept. of Nat. Res., Madison, Wisc. 53 pp.

John, K.R., and A.D. Hasler. 1956. Observations on some factors affecting the hatching of eggs and the survival of young shallow-water cisco, *Leucichthys artedi* LeSueur, in Lake Mendota, Wisconsin. Limnol. Oceanogr. 1:176-194.

Lind, O.T. 1979. Handbook of common methods in limnology. Second edition. C.V. Mosby Co., St. Louis, MO.

Liston, C.R., C. McNabb, W. Duffy, D. Ashton, R. Ligman, F. Koehler, J. Bohr, G. Fleischer, J. Schuette, and R. Yanusz. 1983. Environmental baseline studies of the St. Marys River near Neebish Island, Michigan, prior to proposed extension of the navigation season. U.S. Fish and Wildl. Serv., Washington, D.C. FWS/OBS-80/62.2. 316 pp.

Liston, C.R., C. McNabb, and coauthors. 1985. Environmental baseline studies of the St. Marys River during 1982 and 1983

prior to proposed extension of the navigation season. Data gathered under contract with U.S. Fish and Wildlife Service. Draft report provided by U.S. Army Corps of Engineers, Detroit District.

Loftus, D.H. 1979a. North Channel larval fish survey: Joe Dollar Bay to Aird Bay, May, 1979. Rep. 2-79. Lake Huron Fish. Assessment Unit, Ont. Min. Nat. Res., Owen Sound, Ont. 33 pp.

Loftus, D.H. 1979b. Larval fish sampling in Lake Huron, 1979. Rep. 3-79. Lake Huron Fish. Assessment Unit., Ont. Min. Nat. Res., Owen Sound, Ont. 21 pp.

Loftus, D.H. 1982. Larval fish sampling in Lake Huron, 1978. Ontario Fish. Tech. Rep. Ser. No. 2. Ont. Min. Nat. Res., Fish. Branch, Toronto, Ont. 12 pp.

Logan, S.M. 1963. Winter observations on bottom organisms and trout in Bridger Creek, Montana. Trans. Amer. Fish. Soc. 92:140-145.

Mansfield, P.J., D.J. Jude, D.T. Michaud, D.C. Brazo, and J. Gulvas. 1983. Distribution and abundance of larval burbot and deepwater sculpin in Lake Michigan. Trans. Amer. Fish. Soc. 112:162-172.

Matter, W.J. and A.H. Hopwood. 1980. Vertical distribution of invertebrate drift in a large river. Limnol. Oceanogr. 25:1117-1121.

McLay, C.L. 1970. A theory concerning the distance travelled by animals entering the drift of a stream. J. Fish. Res. Board Canada 27:359-370.

Mendenhall, W. 1971. Introduction to probability and statistics. Third edition. Duxbury Press, Belmont, Calif.

Morgan, C.C. and A.D. Waddell. 1961. Diurnal variation in the emergence of some aquatic insects. Trans. Royal Entomol. Soc. London 113:123-137.

Morris, L.A., R.N. Langemeier, T.R. Russell, and A. Witt, Jr. 1968. Effects of main stem impoundments and channelization upon the limnology of the Missouri River, Nebraska. Trans. Amer. Fish. Soc. 97:380-388.

Muller, K. 1954a. Investigations on the organic drift in north Swedish streams. Rep. Inst. Freshwat. Res. Drottningholm 35:133-148.

Muller, K. 1954b. Die Drift in fliessenden Gewassern. Arch. Hydrobiol. 49:539-545.

Mundie, J.H. 1956. The biology of flies associated with water supply. J. Inst. Publ. Hlth. Engrs. 55:178-193.

Pearson, W.D. 1970. Drift of *Oligophlebodes sigma* and *Baetis bicaudatus* in a mountain stream. PhD thesis. Utah State Univ., Logan, UT.

Pearson, W.D., and D.R. Franklin. 1968. Some factors affecting drift rates of *Baetis* and Simuliidae in a large river. Ecology 49:75-81.

Poe, T.P., and T.A. Edsall. 1982. Effects of vessel-induced waves on the composition and amount of drift in an ice environment in the St. Marys River. Admin. Rep. 82-6, U.S. Fish and Wildl. Serv., Ann Arbor, MI.

Poe, T.P., T.A. Edsall, and J.K. Hiltunen 1980. Effects of vessel-induced waves in an ice environment on the St. Marys River. Admin. Rept. 80-6. U.S. Fish and Wildlife Serv. Great Lakes Fish. Lab. Ann Arbor, MI. 125 pp.

Prescott, G.W. 1962. Algae of the western Great Lakes area. Wm. C. Brown Co., Dubuque, Iowa.

Scott, W.B., and E.J. Crossman. 1973. Freshwater fishes of Canada. Fish. Res. Board Can. Bull. 184. 966 pp.

Seagle, H.H., and F.H. Zumwalt. 1981. Evaluation of the effects of tow passage on aquatic macroinvertebrate drift in Pool 26, Mississippi River. Rept. for the Env. Work Team, Upper Miss. Riv. Basin Comm. Master Plan, Minn., MN. 91 pp.

Seagle, H.H., J.C. Hutton, and K.S. Lubinski. 1982. A comparison of benthic invertebrate community composition in the Mississippi and Illinois Rivers, Pool 26. J. Freshwat. Ecol. 1:637-650.

Seibel, E. C.T. Carlson, and J.W. Maresca, Jr. 1975. Lake and shore ice conditions on southeastern Lake Michigan in the vicinity of the Donald C. Cook nuclear plant: Winter 1973-74. Spec. Rep. No. 55. Great Lakes Research Div., Univ. of Mich., Ann Arbor, Mich. 62 pp.

Selgeby, J.H. 1975. Life histories and abundance of crustacean zooplankton in the outlet of Lake Superior, 1971-1972. Can. J. Fish. Res. Board Can. 32:461-470.

Selgeby, J.H., W.R. MacCallum, and D.V. Swedberg. 1978. Predation by rainbow smelt (*Osmerus mordax*) on lake herring (*Coregonus artedii*) in western Lake Superior. J. Fish. Res. Board Can. 35:1457-1463.

Smith, S.H. 1956. Life history of lake herring of Green Bay, Lake Michigan. U.S. Fish Wildl. Serv. Fish. Bull. 109:87-138.

Sokal, R.R., and F.J. Rohlf. 1969. Biometry. The principles and practice of statistics in biological research. W.H. Freeman and Co., San Francisco, CA. 776 pp.

United States Army Corps of Engineers. 1984. St. Marys River oil/toxic substance spill study. Current velocities and directions, 1980-1983. U.S. Army Corps of Engineers, Detroit District, Great Lakes Hydraulics and Hydrology Branch.

Voss, E.G. 1972. Michigan flora. Part I, Gymnosperms and monocots. Cranbrook Inst. Sci. and Univ. Mich. Herbarium. Bulletin 55.

Waters, T.F. 1961. Standing crop and drift of stream bottom organisms. Ecology 42:532-537.

Waters, T.F. 1962a. A method to estimate production rate of a stream bottom invertebrate. Trans. Amer. Fish. Soc. 91:243-250.

Waters, T.F. 1962b. Diurnal periodicity in the drift of stream invertebrates. Ecology 43:316-320.

Waters, T.F. 1966. Production rate, population density, and drift of a stream invertebrate. Ecology 47:595-604.

Waters, T.F. 1972. The drift of stream insects. Ann. Rev. Entomol. 17:253-272.

Waters, T.F. 1981. Seasonal patterns in production and drift of *Gammarus pseudolimnaeus* in Valley Creek, Minnesota. Ecology 62:1458-1466.

APPENDIXES

List of Appendixes

Appendixes 201-228. Macrophyte, benthos, fish larvae and seston dry weight biomass estimates for Lake Nicolet summer drift samples.

Appendixes 229-241. Macrophyte, benthos, fish larvae and seston dry weight biomass estimates for Point aux Frenes winter drift samples.

Appendixes 242-261. Macrophyte, benthos, fish larvae and seston dry weight biomass estimates for Point aux Frenes summer drift samples.

Appendixes 262-266. Light measurements: energy flux and extinction coefficients for Izaak Walton Bay, Lake Nicolet, western Lake Munuscong, eastern Lake Munuscong, and Raber Bay.

Appendix 267. Zooplankton abundance, composition, and statistics for vaious dates, stations, mesh sizes, and sampling periods on the St. Marys River.

Appendix 1. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the winter sampling period at Frechette Point on the St. Marys River. Night 2 current velocities for stations 5-7 are averages of previous sample periods for each respective station. Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	2.58	19.8	121.5	1.98	19.8	93.2
2	1.0	Mid	355	2.17	27.7	142.9	2.00	26.7	127.0
	2.0	Bott	355	2.17	23.0	118.7	2.00	25.9	123.2
3	1.5	Mid	355	2.30	38.1	208.4	2.00	35.8	170.3
	3.0	Bott	355	2.30	34.7	189.8	2.00	32.8	156.0
3	1.5	Mid	153	1.22	36.9	107.0	2.00	35.8	170.3
	3.0	Bott	153	1.22	31.2	90.5	2.00	32.8	156.0
4	0.5	Surf	355	2.00	43.4	206.4	0.87	37.8	78.2
	4.0	Mid	355	2.12	46.5	234.4	0.92	50.4	110.3
	8.2	Bott	355	2.12	38.9	196.1	0.92	41.4	90.6
4	0.5	Surf	153	0.95	40.8	92.2	1.00	36.9	87.7
	4.0	Mid	153	1.08	48.0	123.3	1.05	48.0	119.8
	8.2	Bott	153	1.08	41.9	107.6	1.05	40.4	100.9
5	1.5	Mid	355	1.93	19.4	89.0	1.42	18.7	63.1
	3.0	Bott	355	1.93	8.4	38.5	1.42	10.1	34.1
5	1.5	Mid	153	1.00	18.6	44.2	1.38	18.3	60.0
	3.0	Bott	153	1.00	5.3	12.6	1.38	9.9	32.5
6	1.0	Mid	355	2.03	18.7	90.3	1.95	21.2	98.3
	2.0	Bott	355	2.03	8.1	39.1	1.95	10.4	48.2
7	1.0	Bott	355	2.50	16.0	95.1	2.33	15.2	84.2

Appendix 1. Continued.

				Day 2			Night 2		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	2.00	19.8	94.2	2.02	21.3	102.3
2	1.0	Mid	355	2.00	27.1	128.9	2.00	25.9	123.2
	2.0	Bott	355	2.00	24.7	117.5	2.00	22.9	108.9
3	1.5	Mid	355	2.00	36.6	174.1	2.00	21.3	101.3
	3.0	Bott	355	2.00	33.5	159.3	2.00	18.3	87.0
4	0.5	Surf	355	2.03	38.4	185.4	2.10	40.5	202.2
	4.0	Mid	355	2.03	46.6	224.9	2.10	51.5	257.2
	8.2	Bott	355	2.03	43.3	209.0	2.10	42.7	213.2
5	1.5	Mid	355	2.00	18.9	89.9	1.85	19.0	83.6
	3.0	Bott	355	2.00	12.2	58.0	1.85	10.2	44.9
6	1.0	Mid	355	1.88	18.6	83.1	1.88	19.5	87.2
	2.0	Bott	355	1.88	9.4	42.0	1.88	9.3	41.6
7	1.0	Bott	355	1.85	15.2	66.9	1.88	15.5	69.3

Appendix 2. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the winter sampling period at lower Lake Nicolet on the St. Marys River. Current velocities for Night 1, Day 2, and Night 2 periods are based on measurements taken during the Day 1 period (2 March) for stations 1-4. Similarly, velocities for Night 1, Day 2, and Night 2 periods for stations 6-9 are based on Day 1 period (6 March) measurements. Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	2.37	10.1	56.9	2.42	10.1	58.1
2	1.0	Mid	355	2.28	12.8	69.4	2.38	12.8	72.4
	2.0	Bott	355	2.28	11.3	61.3	2.38	11.3	63.9
3	1.5	Mid	355	2.10	22.9	114.3	2.42	22.9	131.8
	3.0	Bott	355	2.10	19.8	98.9	2.42	19.8	113.9
3	1.5	Mid	153	2.12	22.9	115.4	2.27	22.9	123.6
	3.0	Bott	153	2.12	19.8	99.8	2.27	19.8	106.9
4	0.5	Surf	355	2.00	30.5	145.0	2.25	30.5	163.2
	4.6	Mid	355	2.03	35.1	169.4	2.27	35.1	189.5
	9.2	Bott	355	2.03	35.1	169.4	2.27	35.1	189.5
4	0.5	Surf	153	2.08	30.5	150.8	2.17	30.5	157.4
	4.6	Mid	153	2.12	35.1	176.9	2.18	35.1	181.9
	9.2	Bott	153	2.12	35.1	176.9	2.18	35.1	181.9
5	1.0	Mid	355	-	-	-	-	-	-
	2.0	Bott	355	-	-	-	-	-	-
6	0.5	Surf	355	1.97	18.6	87.1	1.98	18.6	87.6
	4.0	Mid	355	1.97	23.2	108.7	2.02	23.2	111.4

Appendix 2. Continued.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
	8.2	Bott	355	1.97	21.3	99.8	2.02	21.3	102.3
6	0.5	Surf	153	1.97	18.6	87.1	1.98	18.6	87.6
	4.0	Mid	153	1.97	23.2	108.7	2.02	23.2	111.4
	8.2	Bott	153	1.97	21.3	99.8	2.02	21.3	102.3
7	1.5	Mid	355	2.07	17.7	87.1	2.00	17.7	84.2
	3.0	Bott	355	2.07	13.4	66.0	2.00	13.4	63.7
7	1.5	Mid	153	2.07	17.7	87.1	2.00	17.7	84.2
	3.0	Bott	153	2.07	13.4	66.0	2.00	13.4	63.7
8	1.0	Mid	355	2.15	12.5	63.9	2.00	12.5	59.4
	2.0	Bott	355	2.15	11.9	60.8	2.00	11.9	56.6
9	1.0	Bott	355	2.15	6.1	31.2	2.03	6.1	29.4

Appendix 2. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 2 Time	Day 2 Velocity	Day 2 Volume	Night 2 Time	Night 2 Velocity	Night 2 Volume
1	1.0	Bott	355	2.43	10.1	58.4	2.18	10.1	52.4
2	1.0	Mid	355	2.37	12.8	72.1	2.13	12.8	64.8
	2.0	Bott	355	2.37	11.3	63.7	2.13	11.3	57.2
3	1.5	Mid	355	2.23	22.9	121.4	2.23	22.9	121.4
	3.0	Bott	355	2.23	19.8	105.0	2.23	19.8	105.0
4	0.5	Surf	355	2.08	30.5	150.8	2.05	30.5	148.7
	4.6	Mid	355	2.08	35.1	173.6	2.05	35.1	171.1
	9.2	Bott	355	2.08	35.1	173.6	2.05	35.1	171.1
5	1.0	Mid	355	-	-	-	-	-	-
	2.0	Bott	355	-	-	-	-	-	-
6	0.5	Surf	355	2.07	18.6	91.6	2.23	18.6	98.6
	4.6	Mid	355	2.07	23.2	114.2	2.25	23.2	124.1
	9.2	Bott	355	2.07	21.3	104.8	2.25	21.3	114.0
7	1.5	Mid	355	2.20	17.7	92.6	2.05	17.7	86.3
	3.0	Bott	355	2.20	13.4	70.1	2.05	13.4	65.3
8	1.0	Mid	355	2.22	12.5	66.0	1.95	12.5	58.0
	2.0	Bott	355	2.22	11.9	62.8	1.95	11.9	55.2
9	1.0	Bott	355	2.22	6.1	32.2	1.82	6.1	26.4

Appendix 3. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the winter sampling period at Pt. aux Frenes on the St. Marys River. Current velocities for Day 1, Day 2, and Night 2 periods are based on measurements taken during the Night 1 period (26 February) for stations 1, 3, and 4. Velocities for station 2 are based on measurements taken during the Day 1 period (27 February). Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	9.25	1.6	35.2	15.25	1.6	58.0
2	1.0	Mid	355	9.65	3.4	78.0	13.52	3.4	109.3
	2.0	Bott	355	9.65	3.4	78.0	13.52	3.4	109.3
3	1.5	Mid	355	10.05	2.1	50.2	13.22	2.1	66.0
	3.0	Bott	355	10.05	3.4	81.2	13.22	3.4	106.9
3	1.5	Mid	153	9.92	2.1	49.5	13.35	2.1	66.7
	3.0	Bott	153	9.92	3.4	80.2	13.35	3.4	107.9
4	0.5	Surf	355	9.30	5.8	128.3	14.00	5.8	193.1
	4.9	Mid	355	9.30	7.3	161.4	14.00	7.3	243.0
	9.8	Bott	355	9.30	4.9	108.4	14.00	4.9	163.1
4	0.5	Surf	153	9.10	5.8	125.5	13.88	5.8	191.4
	4.9	Mid	153	9.10	7.3	158.0	13.88	7.3	240.9
	9.8	Bott	153	9.10	4.9	106.0	13.88	4.9	161.7

Appendix 3. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 2			Night 2		
				Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	9.25	1.6	35.2	13.60	1.6	51.7
2	1.0	Mid	355	9.00	3.4	72.8	13.52	3.4	109.3
	2.0	Bott	355	9.00	3.4	72.8	13.52	3.4	109.3
3	1.5	Mid	355	8.93	2.1	44.6	13.17	2.1	65.8
	3.0	Bott	355	8.93	3.4	72.2	13.17	3.4	106.5
4	0.5	Surf	355	9.90	5.8	136.5	13.28	5.8	183.1
	4.6	Mid	355	9.90	7.3	171.8	13.28	7.3	230.5
	9.8	Bott	355	9.90	4.9	115.3	13.28	4.9	154.7

Appendix 4. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the summer sampling period at Frechette Point on the St. Marys River. Current velocities for all stations during the Night 1 period are based on Night 2 measurements. Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	1.58	29.9	112.3	0.57	23.4	31.7
2	1.0	Mid	355	1.58	36.5	137.1	0.58	36.5	50.3
	2.0	Bott	355	1.58	31.0	116.5	0.58	32.1	44.3
3	1.5	Mid	355	0.93	42.0	92.9	0.63	33.2	49.7
	3.0	Bott	355	0.93	32.1	71.0	0.63	32.1	48.1
3	1.5	Mid	153	0.68	42.0	67.9	0.63	33.2	49.7
	3.0	Bott	153	0.68	32.1	51.9	0.62	32.1	48.1
4	0.5	Surf	355	0.97	52.9	122.0	0.53	50.7	63.9
	4.6	Mid	355	0.97	57.3	132.2	0.53	42.0	52.9
	9.2	Bott	355	0.97	54.0	124.5	0.53	35.4	44.6
4	0.5	Surf	153	0.52	52.9	65.4	0.53	50.7	63.9
	4.6	Mid	153	0.52	57.3	70.8	0.53	42.0	52.9
	9.2	Bott	153	0.52	54.0	66.8	0.53	35.4	44.6
5	1.5	Mid	355	0.55	29.9	39.1	0.58	19.0	26.2
	3.0	Bott	355	0.55	23.4	30.6	0.58	20.1	27.7
5	1.5	Mid	153	0.62	29.9	44.1	0.57	19.0	25.8
	3.0	Bott	153	0.62	23.4	34.5	0.57	20.1	27.2
6	1.0	Mid	355	0.80	27.8	52.9	0.52	25.6	31.7
	2.0	Bott	355	0.80	22.3	42.4	0.52	22.3	27.6
7	1.0	Bott	355	0.65	22.3	34.5	0.55	19.0	24.8

Appendix 4. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 2 Time	Day 2 Velocity	Day 2 Volume	Night 2 Time	Night 2 Velocity	Night 2 Volume
1	1.0	Bott	355	0.48	43.1	49.2	0.50	23.4	27.8
2	1.0	Mid	355	0.52	46.4	57.4	0.53	36.5	46.0
	2.0	Bott	355	0.52	34.3	42.4	0.53	32.1	40.5
3	1.5	Mid	355	0.52	47.5	58.7	0.75	33.2	59.2
	3.0	Bott	355	0.52	39.8	49.2	0.75	32.1	57.2
4	0.5	Surf	355	0.52	58.4	72.2	0.52	50.7	62.7
	4.6	Mid	355	0.52	62.8	77.6	0.52	42.0	51.9
	9.2	Bott	355	0.52	49.7	61.5	0.52	35.4	43.8
5	1.5	Mid	355	0.60	27.8	39.7	0.58	19.0	26.2
	3.0	Bott	355	0.60	23.4	33.4	0.58	20.1	27.7
6	1.0	Mid	355	0.52	36.5	45.1	0.77	25.6	46.9
	2.0	Bott	355	0.52	32.1	39.7	0.77	22.3	40.8
7	1.0	Bott	355	0.50	29.9	35.5	0.90	19.0	40.7

Appendix 5. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the summer sampling period at lower Lake Nicolet on the St. Marys River. Surf = subsurface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	0.53	23.4	29.5	0.88	11.3	23.6
2	1.0	Mid	355	0.60	27.8	39.7	0.80	9.1	17.3
	2.0	Bott	355	0.60	29.9	42.7	0.80	11.3	21.5
3	1.5	Mid	355	0.98	28.8	67.1	0.68	9.1	14.7
	3.0	Bott	355	0.98	24.5	57.1	0.68	10.2	16.5
3	1.5	Mid	153	0.98	28.8	67.1	0.73	9.1	15.8
	3.0	Bott	153	0.98	24.5	57.1	0.73	10.2	17.7
4	0.5	Surf	355	0.75	22.3	39.8	0.77	19.0	34.8
	4.6	Mid	355	0.75	23.4	41.7	0.77	19.0	34.8
	9.2	Bott	355	0.75	15.7	28.0	0.77	13.5	24.7
4	0.5	Surf	153	0.75	22.3	39.8	0.75	19.0	33.9
	4.6	Mid	153	0.75	23.4	41.7	0.75	19.0	33.9
	9.2	Bott	153	0.75	15.7	28.0	0.75	13.5	24.1
5	1.0	Mid	355	0.62	21.2	31.3	0.97	14.6	33.7
	2.0	Bott	355	0.62	14.6	21.5	0.97	14.6	33.7
6	0.5	Surf	355	0.67	16.8	26.8	0.67	22.3	35.5
	4.6	Mid	355	0.67	14.6	23.3	0.67	23.4	37.3
	9.2	Bott	355	0.67	14.6	23.3	0.67	11.3	18.0
6	0.5	Surf	153	0.62	16.8	24.8	0.67	22.3	35.5
	4.6	Mid	153	0.62	14.6	21.5	0.67	23.4	37.3
	9.2	Bott	153	0.62	14.6	21.5	0.67	11.3	18.0

Appendix 5. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 1 Time	Day 1 Velocity	Day 1 Volume	Night 1 Time	Night 1 Velocity	Night 1 Volume
7	1.5	Mid	355	1.20	23.4	66.8	1.38	6.9	22.6
	3.0	Bott	355	1.20	21.2	60.5	1.38	5.9	19.4
7	1.5	Mid	153	1.18	23.4	65.7	1.38	6.9	22.6
	3.0	Bott	153	1.18	21.2	59.5	1.38	5.9	19.4
8	1.0	Mid	355	1.63	9.1	35.3	1.55	9.1	33.5
	2.0	Bott	355	1.63	8.0	31.0	1.55	8.0	29.5
9	1.0	Bott	355	2.15	2.3	11.8	1.63	5.9	22.9

Appendix 5. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 2 Time	Day 2 Velocity	Day 2 Volume	Night 2 Time	Night 2 Velocity	Night 2 Volume
1	1.0	Bott	355	1.42	2.8	9.5	1.63	2.8	10.9
2	1.0	Mid	355	1.00	9.1	21.6	1.28	9.1	27.7
	2.0	Bott	355	1.00	10.2	24.3	1.28	8.0	24.3
3	1.5	Mid	355	1.02	8.0	19.4	1.00	11.3	26.9
	3.0	Bott	355	1.02	10.2	24.7	1.00	9.1	21.6
4	0.5	Surf	355	0.68	21.2	34.3	0.67	22.3	35.5
	4.6	Mid	355	0.68	22.3	36.1	0.67	24.5	39.0
	9.2	Bott	355	0.68	15.7	25.4	0.67	22.3	35.5
5	1.0	Mid	355	1.02	5.9	14.3	1.85	9.1	40.0
	2.0	Bott	355	1.02	9.1	22.1	1.85	10.2	44.9
6	0.5	Surf	355	0.67	24.5	39.0	0.67	16.8	26.8
	4.6	Mid	355	0.67	22.3	35.5	0.67	22.3	35.5
	9.2	Bott	355	0.67	17.9	28.5	0.67	17.9	28.5
7	1.5	Mid	355	1.05	6.4	16.0	1.00	6.9	16.4
	3.0	Bott	355	1.05	5.9	14.7	1.00	4.8	11.4
8	1.0	Mid	355	1.10	9.1	23.8	1.08	8.0	20.5
	2.0	Bott	355	1.10	6.9	18.0	1.08	4.8	12.3
9	1.0	Bott	355	1.17	4.8	13.4	1.22	6.9	20.0

Appendix 6. Length of time sampled (h), current velocity (cm/sec), and total volume of water filtered (m^3) during the summer sampling period at Pt. aux Frenes on the St. Marys River. Since Day 1/Day 2 and Night 1/Night 2 samples were collected consecutively on the same day or night period, respectively, for all stations except Day 1/Day 2 periods for station 1, current velocities are based on measurements taken during respective periods. Night 1 and 2 velocities for stations 5-7 are based on day measurements due to malfunctioning current meter. Weather conditions at stations 5-7 were the same during both day and night periods. Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

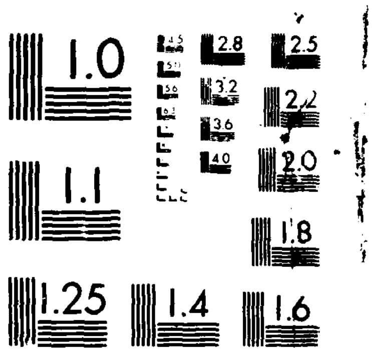
				Day 1			Night 1		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	1.30	12.4	38.3	0.77	8.0	14.6
2	1.0	Mid	355	1.15	12.4	33.9	0.77	12.4	22.7
	2.0	Bott	355	1.15	12.4	33.9	0.77	11.3	20.7
3	1.5	Mid	355	1.05	16.8	41.9	0.92	9.1	19.9
	3.0	Bott	355	1.05	15.7	39.2	0.92	12.4	27.1
3	1.5	Mid	153	1.00	16.8	39.9	0.93	9.1	20.1
	3.0	Bott	153	1.00	15.7	37.3	0.93	12.4	27.4
4	0.5	Surf	355	0.60	27.8	39.7	0.55	24.5	32.0
	4.6	Mid	355	0.60	29.9	42.7	0.55	22.3	29.2
	9.2	Bott	355	0.60	24.5	35.0	0.55	20.1	26.3
4	0.5	Surf	153	0.57	27.8	37.7	0.60	24.5	35.0
	4.6	Mid	153	0.57	29.9	40.5	0.60	22.3	31.8
	9.2	Bott	153	0.57	24.5	33.2	0.60	20.1	28.7
5	1.5	Mid	355	0.75	15.7	28.0	0.50	15.7	18.7
	3.0	Bott	355	0.75	17.9	31.9	0.50	17.9	21.3
5	1.5	Mid	153	0.75	15.7	28.0	0.52	15.7	19.4

Appendix 6. Continued.

Sta.	Depth (m)	Vert. depth	Mesh	Day 1 Time	Day 1 Velocity	Day 1 Volume	Night 1 Time	Night 1 Velocity	Night 1 Volume
	3.0	Bott	153	0.75	17.9	31.9	0.52	17.9	22.1
6	1.0	Mid	355	0.52	15.7	19.4	0.47	15.7	17.5
	2.0	Bott	355	0.52	14.6	18.1	0.47	14.6	16.3
7	1.0	Bott	355	0.63	15.7	23.5	0.45	15.7	16.8

AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86 3/7

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

Appendix 6. Continued.

				Day 2			Night 2		
Sta.	Depth (m)	Vert. depth	Mesh	Time	Velocity	Volume	Time	Velocity	Volume
1	1.0	Bott	355	0.85	10.2	20.6	0.77	8.0	14.6
2	1.0	Mid	355	0.82	16.8	32.8	0.78	12.4	23.0
	2.0	Bott	355	0.82	21.2	41.3	0.78	11.3	21.0
3	1.5	Mid	355	0.78	27.8	51.6	1.00	9.1	21.6
	3.0	Bott	355	0.78	22.3	41.4	1.00	12.4	29.5
4	0.5	Surf	355	0.52	27.8	34.4	0.52	24.5	30.3
	4.6	Mid	355	0.52	29.9	37.0	0.52	22.3	27.6
	9.2	Bott	355	0.52	24.5	30.3	0.52	20.1	24.9
5	1.5	Mid	355	0.52	15.7	19.4	0.35	15.7	13.1
	3.0	Bott	355	0.52	17.9	22.1	0.35	17.9	14.9
6	1.0	Mid	355	0.50	15.7	18.7	0.25	15.7	9.3
	2.0	Bott	355	0.50	14.6	17.4	0.25	14.6	8.7
7	1.0	Bott	355	0.50	15.7	18.7	0.30	15.7	11.2

Appendix 7. Winter and summer water temperatures (C) for drift samples at transect stations on the St. Marys River. During the summer sample period, the temperature probe malfunctioned until replaced on 7 June. As a consequence, station temperatures for Frechette Point (FP) were collected during daylight hours on 10 June, while those for stations 1-4 at lower Lake Nicolet (LN) were taken during daylight hours on 8 June. At Point aux Frenes (PAF) consecutive sample collections were made for Day 1/Day 2 and Night 1/Night 2 periods for all stations but Day 1/Day 2 samples for station 1 (see Table 1), making temperature values the same within respective Day/Night periods. Surf = sub-surface, Mid = mid-depth, Bott = near-bottom, Trans. = Transect, Sta. = Station, m = meters.

Trans.	Sta.	Depth (m)	Vert. depth	Mesh	Day 1	Night 1	Day 2	Night 2
FP	1	1.0	Bott	355	0.5	0.5	0.5	0.4
FP	2	1.0	Mid	355	0.5	0.5	-	0.5
		2.0	Bott	355	0.5	0.5	-	0.5
FP	3	1.5	Mid	355	0.5	0.5	-	0.5
		3.0	Bott	355	0.5	0.5	-	0.5
	3	1.5	Mid	153	0.5	0.5	-	-
		3.0	Bott	153	0.5	0.5	-	-
FP	4	0.5	Surf	355	0.0	-	0.0	0.5
		4.0	Mid	355	-0.5	-	-0.5	0.5
		8.2	Bott	355	0.0	-	0.0	0.5
	4	0.5	Surf	153	0.0	-	-	-
		4.0	Mid	153	-0.5	-	-	-
		8.2	Bott	153	0.0	-	-	-
FP	5	1.5	Mid	355	0.0	-	0.0	0.5
		3.0	Bott	355	0.0	-	0.0	0.5
	5	1.5	Mid	153	0.0	-	-	-
		3.0	Bott	153	0.0	-	-	-
FP	6	1.0	Mid	355	0.5	-	0.0	0.5
		2.0	Bott	355	0.3	-	-0.5	0.5
FP	7	1.0	Bott	355	0.5	-	0.5	0.5
LN	1	1.0	Bott	355	-	-	-0.5	-
LN	2	1.0	Mid	355	-	-	0.0	-

Appendix 7. Continued.

Trans.	Sta.	Depth (m)	Vert. depth	Mesh	Day 1	Night 1	Day 2	Night 2
		2.0	Bott	355	-	-	0.0	-
LN	3	1.5	Mid	355	-	-	0.0	-
		3.0	Bott	355	-	-	0.0	-
	3	1.5	Mid	153	-	-	-	-
		3.0	Bott	153	-	-	-	-
LN	4	0.5	Surf	355	-	-	0.0	-
		4.6	Mid	355	-	-	-0.5	-
		9.2	Bott	355	-	-	-0.5	-
	4	0.5	Surf	153	-	-	-	-
		4.6	Mid	153	-	-	-	-
		9.2	Bott	153	-	-	-	-
LN	5	1.0	Mid	355	-	-	-	-
		2.0	Bott	355	-	-	-	-
LN	6	0.5	Surf	355	0.4	-	-	-
		4.0	Mid	355	0.4	-	-	-
		8.2	Bott	355	0.3	-	-	-
	6	0.5	Surf	153	0.4	-	-	-
		4.0	Mid	153	0.4	-	-	-
		8.2	Bott	153	0.3	-	-	-
LN	7	1.5	Mid	355	0.4	-	-	-
		3.0	Bott	355	0.3	-	-	-
	7	1.5	Mid	153	0.4	-	-	-
		3.0	Bott	153	0.3	-	-	-
LN	8	1.0	Mid	355	0.5	-	-	-
		2.0	Bott	355	0.4	-	-	-
LN	9	1.0	Bott	355	0.2	-	-	-
PAF	1	1.0	Bott	355	-	0.4	-	-
PAF	2	1.0	Mid	355	0.4	-	-	-
		2.0	Bott	355	0.4	-	-	-
PAF	3	1.5	Mid	355	-	0.4	-	-
		3.0	Bott	355	-	0.4	-	-
	3	1.5	Mid	153	-	0.4	-	-
		3.0	Bott	153	-	0.4	-	-

Appendix 7. Continued.

Trans.	Sta.	Depth (m)	Vert. depth	Mesh	Day 1	Night 1	Day 2	Night 2
PAF	4	0.5	Surf	355	-	0.0	-	-
		4.9	Mid	355	-	0.0	-	-
		9.8	Bott	355	-	0.0	-	-
	4	0.5	Surf	153	-	0.0	-	-
		4.9	Mid	153	-	0.0	-	-
		9.8	Bott	153	-	0.0	-	-
FP	1	1.0	Bott	355	-	-	-	-
FP	2	1.0	Mid	355	9.5	-	-	-
		2.0	Bott	355	9.5	-	-	-
FP	3	1.5	Mid	355	9.4	-	-	-
		3.0	Bott	355	9.4	-	-	-
	3	1.5	Mid	153	9.4	-	-	-
		3.0	Bott	153	9.4	-	-	-
FP	4	0.5	Surf	355	9.4	-	-	-
		4.6	Mid	355	9.4	-	-	-
		9.2	Bott	355	9.4	-	-	-
	4	0.5	Surf	153	9.4	-	-	-
		4.6	Mid	153	9.4	-	-	-
		9.2	Bott	153	9.4	-	-	-
FP	5	1.5	Mid	355	9.4	-	-	-
		3.0	Bott	355	9.3	-	-	-
	5	1.5	Mid	153	9.4	-	-	-
		3.0	Bott	153	9.3	-	-	-
FP	6	1.0	Mid	355	9.5	-	-	-
		2.0	Bott	355	9.5	-	-	-
FP	7	1.0	Bott	355	-	-	-	-
LN	1	1.0	Bott	355	13.8	-	-	-
LN	2	1.0	Mid	355	11.2	-	-	-
		2.0	Bott	355	11.5	-	-	-
LN	3	1.5	Mid	355	10.5	-	-	-
		3.0	Bott	355	10.5	-	-	-
	3	1.5	Mid	153	10.5	-	-	-
		3.0	Bott	153	10.5	-	-	-

Appendix 7. Continued.

Trans.	Sta.	Depth (m)	Vert. depth	Mesh	Day 1	Night 1	Day 2	Night 2
LN	4	0.5	Surf	355	9.9	-	-	-
		4.6	Mid	355	9.7	-	-	-
		9.2	Bott	355	9.5	-	-	-
	4	0.5	Surf	153	9.9	-	-	-
		4.6	Mid	153	9.7	-	-	-
		9.2	Bott	153	9.5	-	-	-
LN	5	1.0	Mid	355	-	-	-	-
		2.0	Bott	355	-	-	-	-
LN	6	0.5	Surf	355	-	-	9.8	9.5
		4.6	Mid	355	-	-	9.8	9.5
		9.2	Bott	355	-	-	9.8	9.5
	6	0.5	Surf	153	-	-	-	-
		4.6	Mid	153	-	-	-	-
		9.2	Bott	153	-	-	-	-
LN	7	1.5	Mid	355	9.8	10.2	10.0	10.8
		3.0	Bott	355	9.8	10.2	10.0	10.8
	7	1.5	Mid	153	9.8	10.2	-	-
		3.0	Bott	153	9.8	10.2	-	-
LN	8	1.0	Mid	355	10.2	11.0	10.8	10.8
		2.0	Bott	355	10.2	11.0	10.8	10.8
LN	9	1.0	Mid	355	10.8	11.5	11.3	12.0
PAF	1	1.0	Bott	355	13.7	13.0	12.6	13.0
PAF	2	1.0	Mid	355	13.5	13.0	12.6	13.0
		2.0	Bott	355	13.5	13.2	12.6	13.2
PAF	3	1.5	Mid	355	13.5	13.3	12.4	13.3
		3.0	Bott	355	13.5	13.3	12.4	13.3
	3	1.5	Mid	153	13.5	13.3	-	-
		3.0	Bott	153	13.5	13.3	-	-
PAF	4	0.5	Surf	355	11.5	12.4	11.5	12.4
		4.6	Mid	355	11.5	12.4	11.5	12.4
		9.2	Bott	355	11.5	12.4	11.5	12.4
	4	0.5	Surf	153	11.5	12.4	-	-
		4.6	Mid	153	11.5	12.4	-	-
		9.2	Bott	153	11.5	12.4	-	-

Appendix 7. Continued.

Trans.	Sta.	Depth (m)	Vert. depth	Mesh	Day 1	Night 1	Day 2	Night 2
PAF	5	1.5	Mid	355	11.8	11.8	11.8	11.8
		3.0	Bott	355	11.8	11.8	11.8	11.8
	5	1.5	Mid	153	11.8	11.8	-	-
		3.0	Bott	153	11.8	11.8	-	-
PAF	6	1.0	Mid	355	11.8	11.5	11.8	11.5
		2.0	Bott	355	11.8	11.5	11.8	11.5
PAF	7	1.0	Bott	355	11.8	-	11.8	-

Appendix 8. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	21(12)	45	5(5)	<1	0(0)	0	5(5)	<1
Naididae	12(4)	27	32(32)	3	0(0)	0	0(0)	0
Enchytraeidae	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
Mysis relicta	0(0)	0	11(0)	1	0(0)	0	0(0)	0
Hexagenia	0(0)	0	5(5)	<1	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	5(5)	<1	0(0)	0	0(0)	0
Polycentropus	4(4)	9	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	4(4)	9	0(0)	0	0(0)	0	0(0)	0
Chironomidae	8(0)	18	1202(622)	96	21(11)	100	1466(274)	99
Total benthos w/o *Hydra*	25(0)	55	1250(660)	>99	21(11)	100	1471(279)	>99
Total benthos	45(12)	-	1255(665)	-	21(11)	-	1476(283)	-
Total zooplankton	422(49)	-	255(38)	-	740(77)	-	677(253)	-

Appendix 9. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	42(7)	43	39(31)	4	0(0)	0	45(12)	4
Turbellaria	7(7)	7	0(0)	0	0(0)	0	0(0)	0
Naididae	14(7)	14	28(28)	3	0(0)	0	101(37)	8
Tubificidae	3(3)	4	0(0)	0	0(0)	0	0(0)	0
Enchytraeidae	3(3)	4	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	8(8)	1	0(0)	0	32(0)	3
Unid. Trichoptera	0(0)	0	0(0)	0	0(0)	0	4(4)	<1
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	4(4)	<1
Simuliidae	3(3)	4	0(0)	0	0(0)	0	0(0)	0
Ceratopogonidae	0(0)	0	4(4)	0	0(0)	0	0(0)	0
Chironomidae	24(3)	25	890(110)	92	66(58)	100	1047(24)	85
Total benthos w/o _Hydra_	56(21)	57	929(126)	96	66(58)	100	1185(16)	96
Total benthos	98(28)	-	969(157)	-	66(58)	-	1230(28)	-
Total zooplankton	430(9)	-	364(52)	-	243(77)	-	475(4)	-

Appendix 10. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	206(38)	69	101(77)	7	26(17)	37	32(5)	2
Naididae	17(8)	6	28(20)	2	4(4)	6	46(9)	4
Enchytraeidae	4(4)	1	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	12(12)	1	0(0)	0	5(5)	<1
Gammarus	0(0)	0	4(4)	<1	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	4(4)	<1	0(0)	0	0(0)	0
nr. *Stenonema*	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
Ephemera	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	9(9)	1
Unid. Trichoptera	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
Psycodidae	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
Simuliidae	4(4)	1	0(0)	0	0(0)	0	0(0)	0
Chironomidae	67(0)	22	1254(28)	90	38(13)	56	1208(243)	92
Total benthos w/o *Hydra*	93(8)	31	1299(0)	93	43(9)	63	1276(266)	98
Total benthos	299(46)	-	1400(77)	-	68(26)	-	1309(262)	-
Total zooplankton	243(24)	-	138(11)	-	337(68)	-	205(<1)	-

Appendix 11. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	65(7)	57	21(15)	4	6(6)	29	59(20)	7
Naididae	7(2)	6	65(29)	12	6(6)	29	35(35)	4
Tubificidae	0(0)	0	21(21)	4	0(0)	0	0(0)	0
Enchytraeidae	0(0)	0	15(9)	3	0(0)	0	15(15)	2
Mysis relicta	0(0)	0	6(0)	1	0(0)	0	0(0)	0
Hydracarina	29(29)	26	0(0)	0	0(0)	0	0(0)	0
Hexagenia	2(2)	2	0(0)	0	0(0)	0	0(0)	0
Ear. instar Ephemeridae	0(0)	0	0(0)	0	0(0)	0	5(5)	1
T. Ephemeroptera	2(2)	2	0(0)	0	0(0)	0	5(5)	1
Unid. Trichoptera	0(0)	0	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	0(0)	0
Psycodidae	0(0)	0	3(3)	1	0(0)	0	0(0)	0
Simuliidae	0(0)	0	3(3)	1	0(0)	0	0(0)	0
Ceratopogonidae	0(0)	0	3(3)	1	0(0)	0	0(0)	0
Chironomidae	10(10)	9	396(3)	75	9(9)	43	731(39)	87
Total benthos w/o _Hydra_	48(43)	43	511(29)	96	14(14)	71	785(94)	93
Total benthos	113(36)	-	531(44)	-	20(20)	-	844(74)	-
Total zooplankton	271(61)	-	310(101)	-	116(2)	-	287(11)	-

Appendix 12. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	51(14)	30	9(9)	3	-	-	-	-
Turbellaria	23(23)	14	3(3)	1	-	-	-	-
Naididae	14(5)	8	12(0)	4	-	-	-	-
Tubificidae	0(0)	0	6(6)	2	-	-	-	-
Enchytraeidae	0(0)	0	3(3)	1	-	-	-	-
Polychaeta	5(5)	3	0(0)	0	-	-	-	-
Mysis relicta	0(0)	0	3(3)	1	-	-	-	-
Ephemera	0(0)	0	3(3)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	3(3)	1	-	-	-	-
Psycodidae	0(0)	0	3(3)	1	-	-	-	-
Chironomidae	79(14)	46	282(12)	87	-	-	-	-
Total benthos w/o _Hydra_	122(19)	70	314(9)	97	-	-	-	-
Total benthos	173(33)	-	323(0)	-	-	-	-	-
Total zooplankton	950(86)	-	455(122)	-	-	-	-	-

Appendix 13. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	316(126)	64	272(221)	14	176(6)	65	782(345)	14
Turbellaria	5(0)	1	6(0)	<1	0(0)	0	11(0)	<1
Naididae	45(8)	9	112(87)	6	31(13)	12	241(46)	4
Tubificidae	0(0)	0	0(0)	0	0(0)	0	6(6)	<1
Enchytraeidae	0(0)	0	0(0)	0	0(0)	0	17(6)	<1
Polychaeta	3(3)	1	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	3(3)	<1	0(0)	0	6(6)	<1
Gammarus	3(3)	1	0(0)	0	0(0)	0	0(0)	0
T. Amphipoda	3(3)	1	0(0)	0	0(0)	0	0(0)	0
Hydracarina	3(3)	1	0(0)	0	0(0)	0	0(0)	0
Callibaetis	0(0)	0	3(3)	<1	0(0)	0	0(0)	0
Ephemera	0(0)	0	0(0)	0	0(0)	0	11(11)	<1
T. Ephemeroptera	0(0)	0	3(3)	<1	0(0)	0	11(11)	<1
Polycentropus	0(0)	0	0(0)	0	0(0)	0	17(17)	<1
Polycentropodidae	0(0)	0	0(0)	0	0(0)	0	6(6)	<1
Cheumatopsyche	3(3)	1	0(0)	0	0(0)	0	0(0)	0
Triaenodes	0(0)	0	0(0)	0	0(0)	0	6(6)	<1
T. Trichoptera	3(3)	1	0(0)	0	0(0)	0	29(6)	1
Psycodidae	0(0)	0	10(3)	<1	0(0)	0	0(0)	0
Simuliidae	3(3)	1	3(3)	<1	3(3)	1	29(29)	1
Ceratopogonidae	0(0)	0	0(0)	0	0(0)	0	0(0)	0
Chironomidae	113(18)	23	1558(199)	79	60(28)	22	4356(908)	79
Total benthos w/o *Hydra*	177(24)	36	1696(292)	86	94(38)	35	4707(879)	86
Total benthos	493(150)	-	1968(513)	-	270(31)	-	5489(1224)	-
Total zooplankton	165(<1)	-	160(50)	-	115(13)	-	226(14)	-

Appendix 14. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	486(122)	41	80(10)	7	-	-	-	-
Turbellaria	33(11)	3	6(0)	1	-	-	-	-
Naididae	94(6)	8	96(32)	9	-	-	-	-
Enchytraeidae	6(6)	<1	6(6)	1	-	-	-	-
<u>Hyalella azteca</u>	6(6)	<1	0(0)	0	-	-	-	-
T. Amphipoda	6(6)	<1	0(0)	0	-	-	-	-
<u>Hexagenia</u>	0(0)	0	6(0)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	6(0)	1	-	-	-	-
Psycodidae	0(0)	0	10(3)	1	-	-	-	-
Chironomidae	558(204)	47	913(87)	82	-	-	-	-
Empididae	6(6)	<1	0(0)	0	-	-	-	-
<u>Pisidium</u>	6(6)	<1	0(0)	0	-	-	-	-
Total benthos w/o <u>Hydra</u>	707(199)	59	1039(122)	93	-	-	-	-
Total benthos	1193(320)	-	1119(112)	-	-	-	-	-
Total zooplankton	663(53)	-	368(3)	-	-	-	-	-

Appendix 15. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	2(2)	33	38(26)	3	5(5)	3	5(5)	2
Naididae	0(0)	0	6(6)	1	138(138)	68	0(0)	0
Tubificidae	2(2)	33	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	6(6)	1	0(0)	0	15(5)	5
Hyalella azteca	0(0)	0	0(0)	0	3(3)	1	0(0)	0
T. Amphipoda	0(0)	0	0(0)	0	3(3)	1	0(0)	0
Leptophlebia	0(0)	0	0(0)	0	3(3)	1	0(0)	0
T. Ephemeroptera	0(0)	0	0(0)	0	3(3)	1	0(0)	0
Psycodidae	0(0)	0	13(13)	1	0(0)	0	0(0)	0
Chironomidae	2(2)	33	1036(64)	94	54(49)	27	292(64)	94
Total benthos w/o _Hydra_	5(5)	67	1061(90)	97	197(191)	97	307(69)	98
Total benthos	7(7)	-	1100(115)	-	202(197)	-	312(64)	-
Total zooplankton	670(43)	-	1173(89)	-	846(168)	-	311(3)	-

Appendix 16. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	33(22)	60	11(11)	3	-	-	-	-
Turbellaria	11(11)	20	0(0)	0	-	-	-	-
Naididae	0(0)	0	6(6)	1	-	-	-	-
Enchytraeidae	0(0)	0	11(11)	3	-	-	-	-
Psycodidae	0(0)	0	6(6)	1	-	-	-	-
Chironomidae	11(0)	20	405(40)	92	-	-	-	-
Total benthos w/o *Hydra*	22(11)	40	428(63)	97	-	-	-	-
Total benthos	54(33)	-	439(74)	-	-	-	-	-
Total zooplankton	1969(414)	-	1712(113)	-	-	-	-	-

Appendix 17. Mean density ($\bar{X}$), standard error (SE), and percentage of total benthic and ichthyoplanktonic (%T) drift in samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	36(32)	77	18(18)	2	2(2)	14	4(4)	1
Naididae	6(6)	14	14(14)	1	2(2)	14	2(2)	<1
Tubificidae	2(2)	5	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	2(2)	<1
Collembola	0(0)	0	5(5)	<1	0(0)	0	0(0)	0
Chironomidae	2(2)	5	1006(272)	97	11(2)	71	430(122)	98
Total benthos w/o _Hydra_	11(11)	23	1025(290)	98	13(0)	86	434(126)	99
Total benthos	47(43)	-	1043(308)	-	16(2)	-	437(122)	-
Total zooplankton	329(265)	-	680(79)	-	656(55)	-	329(78)	-

Appendix 18. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	337(36)	54	0(0)	0	-	-	-	-
Turbellaria	4(4)	1	0(0)	0	-	-	-	-
Naididae	8(8)	1	0(0)	0	-	-	-	-
Hyalella azteca	4(4)	1	0(0)	0	-	-	-	-
T. Amphipoda	4(4)	1	0(0)	0	-	-	-	-
Psycodidae	0(0)	0	17(8)	3	-	-	-	-
Chironomidae	268(49)	43	497(29)	97	-	-	-	-
Pisidium	4(4)	1	0(0)	0	-	-	-	-
Total benthos w/o _Hydra_	288(45)	46	513(38)	100	-	-	-	-
Total benthos	624(81)	-	513(38)	-	-	-	-	-
Total zooplankton	868(25)	-	1196(182)	-	-	-	-	-

Appendix 19. Mean density ($\bar{X}$), standard error (SE), and percentage of total benthic and ichthyoplanktonic (%T) drift in samples collected on the St. Marys River, 1985.

Taxon	Frechette Point Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	145(43)	61	72(28)	4	29(14)	60	68(16)	7
Naididae	3(3)	1	11(0)	<1	0(0)	0	7(2)	1
Enchytraeidae	0(0)	0	0(0)	0	0(0)	0	2(2)	<1
Polychaeta	0(0)	0	0(0)	0	0(0)	0	2(2)	<1
Mysis relicta	0(0)	0	6(6)	<1	0(0)	0	7(2)	1
Hydracarina	0(0)	0	0(0)	0	0(0)	0	5(5)	<1
Ear. instar Heptageniidae	0(0)	0	0(0)	0	0(0)	0	2(2)	<1
Hexagenia	0(0)	0	6(6)	<1	0(0)	0	5(5)	<1
T. Ephemeroptera	0(0)	0	6(6)	<1	0(0)	0	7(7)	1
Cheumatopsyche	0(0)	0	6(6)	<1	0(0)	0	0(0)	0
Oxythira	0(0)	0	0(0)	0	2(2)	5	0(0)	0
Mystacides	3(3)	1	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	3(3)	1	6(6)	<1	2(2)	5	0(0)	0
Psycodidae	0(0)	0	0(0)	0	0(0)	0	5(0)	<1
Chironomidae	87(5)	36	1832(199)	95	17(12)	35	929(168)	90
Valvata sincera	0(0)	0	0(0)	0	0(0)	0	2(2)	<1
Valvata sp.	0(0)	0	6(6)	<1	0(0)	0	0(0)	0
T. Gastropoda	0(0)	0	6(6)	<1	0(0)	0	2(2)	<1
Pisidium	3(3)	1	0(0)	0	0(0)	0	2(2)	<1
Total benthos w/o Hydra	94(3)	39	1865(188)	96	19(14)	40	969(181)	93
Total benthos	240(41)	-	1937(215)	-	48(29)	-	1037(164)	-
Total zooplankton	179(15)	-	260(41)	-	147(27)	-	141(5)	-

Appendix 20. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	23(5)	33	25(5)	1	-	-	-	-
Naididae	5(5)	7	5(5)	<1	-	-	-	-
Hydracarina	9(9)	13	0(0)	0	-	-	-	-
Collembola	0(0)	0	5(5)	<1	-	-	-	-
<u>Polycentropus</u>	0(0)	0	5(5)	<1	-	-	-	-
T. Trichoptera	0(0)	0	5(5)	<1	-	-	-	-
Psycodidae	0(0)	0	10(10)	1	-	-	-	-
Chironomidae	33(14)	47	1744(0)	97	-	-	-	-
Total benthos w/o <u>Hydra</u>	46(28)	67	1769(25)	99	-	-	-	-
Total benthos	70(33)	-	1794(30)	-	-	-	-	-
Total zooplankton	2669(671)	-	594(25)	-	-	-	-	-

Appendix 21. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	67(11)	80	16(16)	100	6(6)	20	6(6)	20
Naididae	0(0)	0	0(0)	0	0(0)	0	6(6)	20
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	6(6)	20
Heptagenia	0(0)	0	0(0)	0	6(6)	20	0(0)	0
Ear. instar Heptageniidae	0(0)	0	0(0)	0	0(0)	0	6(6)	20
Leptophlebia	0(0)	0	0(0)	0	0(0)	0	6(6)	20
T. Ephemeroptera	0(0)	0	0(0)	0	6(6)	20	12(0)	40
Chironomidae	17(6)	20	0(0)	0	17(6)	60	0(0)	0
Total benthos w/o *Hydra*	17(6)	20	0(0)	0	22(0)	80	24(12)	80
Total benthos	84(6)	-	16(16)	-	28(6)	-	30(6)	-
Total zooplankton	330(13)	-	165(24)	-	208(39)	-	242(11)	-

Appendix 22. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	11(11)	12	0(0)	0	-	-	-	-
Naididae	11(11)	12	8(8)	25	-	-	-	-
Hydracarina	45(23)	50	0(0)	0	-	-	-	-
Chironomidae	23(23)	25	25(8)	75	-	-	-	-
Total benthos w/o *Hydra*	79(34)	88	33(0)	100	-	-	-	-
Total benthos	90(45)	-	33(0)	-	-	-	-	-
Total zooplankton	444(14)	-	649(130)	-	-	-	-	-

Appendix 23. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	91(13)	100	0(0)	0	0(0)	0	11(11)	50
Lepidoptera	0(0)	0	0(0)	0	0(0)	0	11(11)	50
Chironomidae	0(0)	0	0(0)	0	9(9)	100	0(0)	0
Total benthos w/o *Hydra*	0(0)	0	0(0)	0	9(9)	100	11(11)	50
Total benthos	91(13)	-	0(0)	0	9(9)	-	22(0)	-
Total zooplankton	332(1)	-	52(<1)	-	57(21)	-	76(24)	-

Appendix 24. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	62(31)	27	-	-	-	-
Turbellaria	0(0)	0	15(15)	7	-	-	-	-
Naididae	0(0)	0	15(15)	7	-	-	-	-
Hydracarina	40(40)	25	77(46)	33	-	-	-	-
Chironomidae	119(40)	75	62(31)	27	-	-	-	-
Total benthos w/o *Hydra*	159(0)	100	169(15)	73	-	-	-	-
Total benthos	159(0)	-	231(15)	-	-	-	-	-
Total zooplankton	604(169)	-	248(74)	-	-	-	-	-

Appendix 25. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	61(61)	100	25(5)	83	42(42)	37	0(0)	0
Naididae	0(0)	0	0(0)	0	42(42)	37	0(0)	0
Chironomidae	0(0)	0	5(5)	17	30(37)	26	6(6)	100
Total benthos w/o _Hydra_	0(0)	0	5(5)	17	72(72)	63	6(6)	100
Total benthos	61(61)	-	31(10)	-	114(114)	-	6(6)	-
Total zooplankton	174(111)	-	219(22)	-	282(15)	-	221(51)	-

Appendix 26. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	38(13)	100	31(31)	75	0(0)	0	0(0)	0
Chironomidae	0(0)	0	10(10)	25	12(12)	100	0(0)	0
Total benthos w/o *Hydra*	0(0)	0	10(10)	25	12(12)	100	0(0)	0
Total benthos	38(13)	-	41(21)	-	12(12)	-	0(0)	0
Total zooplankton	417(43)	-	214(5)	-	210(18)	-	86(18)	-

Appendix 27. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Winter - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	16(5)	50	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	6(6)	50	0(0)	0	7(7)	25
Leptophlebia	0(0)	0	0(0)	0	0(0)	0	7(7)	25
Ephemera	16(5)	50	0(0)	0	0(0)	0	0(0)	0
Hexagenia	0(0)	0	0(0)	0	7(7)	100	0(0)	0
Ephoron	0(0)	0	0(0)	0	0(0)	0	7(7)	25
T. Ephemeroptera	16(5)	50	0(0)	0	7(7)	100	14(0)	50
Chironomidae	0(0)	0	6(6)	50	0(0)	0	7(7)	25
Total benthos w/o _Hydra_	16(5)	50	12(12)	100	7(7)	100	29(14)	100
Total benthos	32(11)	-	12(12)	-	7(7)	-	29(14)	-
Total zooplankton	304(1)	-	296(82)	-	342(124)	-	155(3)	-

Appendix 28. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	516(151)	60	16(16)	1	1311(193)	51	18(18)	1
Naididae	116(0)	13	110(47)	6	335(91)	13	0(0)	0
Enchytraeidae	0(0)	0	0(0)	0	30(30)	1	0(0)	0
Polychaeta	0(0)	0	0(0)	0	10(10)	<1	0(0)	0
Mysis relicta	0(0)	0	16(16)	1	0(0)	0	36(0)	2
Hyalella azteca	0(0)	0	0(0)	0	10(10)	<1	126(54)	6
T. Amphipoda	0(0)	0	0(0)	0	10(10)	<1	126(54)	6
Hydracarina	0(0)	0	0(0)	0	20(20)	1	0(0)	0
Collembola	0(0)	0	0(0)	0	10(10)	<1	0(0)	0
Caenis	0(0)	0	0(0)	0	0(0)	0	90(18)	4
Baetisca	0(0)	0	0(0)	0	0(0)	0	18(18)	1
Ephemera	0(0)	0	0(0)	0	20(20)	1	0(0)	0
T. Ephemeroptera	0(0)	0	0(0)	0	20(20)	1	108(36)	5
Polycentropus	0(0)	0	0(0)	0	0(0)	0	54(18)	2
Polyplectron	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Hydroptila	9(9)	1	0(0)	0	0(0)	0	0(0)	0
Mystacides	0(0)	0	0(0)	0	0(0)	0	18(18)	1
Oecetis	0(0)	0	95(63)	5	10(10)	<1	486(162)	22
T. Trichoptera	13(13)	2	95(63)	5	10(10)	<1	558(198)	26
Chaoboridae	0(0)	0	962(16)	50	528(41)	21	90(54)	4
Chironomidae	223(53)	26	662(252)	34	244(102)	10	1223(72)	56
Empididae	0(0)	0	0(0)	0	10(10)	<1	18(18)	1
Pisidium	0(0)	0	79(47)	4	10(10)	<1	0(0)	0
Total benthos w/o *Hydra*	352(67)	41	1924(189)	99	1240(20)	49	2158(288)	99
Total benthos	868(218)	-	1940(174)	-	2551(213)	-	2176(306)	-

Appendix 28. Continued.

	Frechette Point Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	9(9)	40	16(16)	33	30(10)	75	18(18)	33
Burbot larvae	9(0)	40	0(0)	0	10(10)	25	0(0)	0
Damaged larvae	4(4)	20	32(32)	67	0(0)	0	36(36)	67
Total fish larvae	22(13)	-	47(16)	-	41(20)	-	54(18)	-
Total zooplankton	252(19)	-	15(1)	-	91(5)	-	12(1)	-

Appendix 29. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	602(157)	53	10(10)	1	1289(331)	65	11(11)	1
Naididae	237(128)	21	70(70)	9	409(78)	21	22(0)	3
Tubificidae	0(0)	0	0(0)	0	17(17)	1	0(0)	0
Mysis relicta	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Crangonyx	0(0)	0	0(0)	0	0(0)	0	11(11)	1
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	11(11)	1
Hydracarina	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Stenacron	0(0)	0	0(0)	0	0(0)	0	11(11)	1
Eurylophella	0(0)	0	0(0)	0	0(0)	0	33(33)	4
Caenis	0(0)	0	10(10)	1	0(0)	0	11(11)	1
Hexagenia	0(0)	0	20(20)	3	0(0)	0	33(33)	4
T. Ephemeroptera	0(0)	0	30(30)	4	0(0)	0	87(65)	11
Lestes	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Polycentropus	0(0)	0	10(10)	1	0(0)	0	43(0)	5
Oecetis	0(0)	0	89(30)	12	0(0)	0	217(22)	26
T. Trichoptera	0(0)	0	99(20)	13	0(0)	0	261(22)	32
Chaoboridae	0(0)	0	288(189)	38	44(9)	2	43(0)	5
Chironomidae	284(15)	25	229(10)	30	226(17)	11	391(22)	47
Amnicola limosa	0(0)	0	0(0)	0	9(9)	<1	0(0)	0
T. Gastropoda	0(0)	0	0(0)	0	9(9)	<1	0(0)	0
Pisidium	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Total benthos w/o *Hydra*	525(109)	47	746(149)	99	706(78)	35	815(120)	99
Total benthos	1127(266)	-	755(139)	-	1995(409)	-	826(109)	-

Appendix 29. Continued.

	Frechette Point Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	47(11)	72	40(20)	100	70(35)	80	33(11)	60
Burbot larvae	15(7)	22	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	4(4)	6	0(0)	0	17(0)	20	22(22)	40
Total fish larvae	66(22)	-	40(20)	-	87(35)	-	54(11)	-
Total zooplankton	379(14)	-	17(<1)	-	175(7,	-	19(1)	-

Appendix 30. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	845(167)	50	45(45)	4	2064(200)	41	37(12)	3
Naididae	515(206)	30	68(23)	6	2359(307)	47	111(37)	8
Tubificidae	13(4)	1	0(0)	0	0(0)	0	0(0)	0
Enchtraeidae	17(0)	1	0(0)	0	35(12)	1	0(0)	0
S. heringianus	9(0)	1	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	11(11)	1	0(0)	0	37(37)	3
Gammarus	0(0)	0	11(11)	1	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	11(11)	1	0(0)	0	62(12)	5
Crangonyx	0(0)	0	0(0)	0	0(0)	0	12(12)	1
T. Amphipoda	0(0)	0	23(23)	2	0(0)	0	74(0)	5
Hydracarina	4(4)	<1	0(0)	0	35(35)	1	0(0)	0
Heptageniidae	0(0)	0	11(11)	1	0(0)	0	12(12)	1
Eurylophella	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Caenis	0(0)	0	11(11)	1	0(0)	0	0(0)	0
Baetisca	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Ephemera	4(4)	<1	11(11)	1	0(0)	0	0(0)	0
Hexagenia	0(0)	0	0(0)	0	12(12)	<1	0(0)	0
T. Ephemeroptera	4(4)	<1	34(34)	3	12(12)	<1	37(12)	3
Polycentropus	0(0)	0	0(0)	0	0(0)	0	25(25)	2
Polyplectron	0(0)	0	11(11)	1	0(0)	0	0(0)	0
Polycentropodidae	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Cheumatopsyche	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Hydropsyche	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Ceraclea	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Mystacides	0(0)	0	0(0)	0	0(0)	0	12(12)	1
Oecetis	0(0)	0	124(11)	11	0(0)	0	358(12)	26

Appendix 30. Continued.

	Frechette Point Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Unid. Trichoptera	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	9(0)	<1	135(0)	12	0(0)	0	432(12)	32
Chaoboridae	0(0)	0	418(79)	37	47(47)	1	12(12)	1
Chironomidae	266(17)	16	395(34)	35	519(24)	10	617(74)	45
Empididae	4(4)	<1	11(11)	1	0(0)	0	0(0)	0
Valvata sincera	17(9)	1	0(0)	0	0(0)	0	0(0)	0
Amnicola limosa	0(0)	0	0(0)	0	12(12)	<1	0(0)	0
T. Gastropoda	17(9)	1	0(0)	0	12(12)	<1	0(0)	0
Total benthos w/o *Hydra*	858(180)	50	1095(192)	96	3019(307)	59	1321(86)	97
Total benthos	1704(348)	-	1140(147)	-	5083(507)	-	1358(74)	-
R. smelt larvae	17(9)	67	0(0)	0	0(0)	0	37(37)	50
Burbot larvae	0(0)	0	0(0)	0	12(12)	100	0(0)	0
Damaged larvae	9(0)	33	0(0)	0	0(0)	0	37(37)	50
Total fish larvae	26(9)	-	0(0)	0	12(12)	-	74(0)	-
Total zooplankton	133(2)	-	15(3)	-	163(115)	-	15(<1)	-

Appendix 31. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1216(409)	69	141(20)	15	1244(204)	81	76(8)	8
Turbellaria	0(0)	0	0(0)	0	9(9)	1	8(8)	1
Naididae	371(167)	21	111(10)	11	145(26)	9	42(42)	5
Tubificidae	0(0)	0	0(0)	0	9(9)	1	0(0)	0
Enchtraeidae	5(5)	<1	20(20)	2	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	20(20)	2	0(0)	0	25(25)	3
Hyalella azteca	0(0)	0	0(0)	0	0(0)	0	8(8)	1
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	8(8)	1
Hydracarina	0(0)	0	0(0)	0	0(0)	0	8(8)	1
Stenonema	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Eurylophella	0(0)	0	20(0)	2	0(0)	0	17(17)	2
Caenis	0(0)	0	0(0)	0	0(0)	0	8(8)	1
Hexagenia	0(0)	0	20(0)	2	0(0)	0	42(8)	5
T. Ephemeroptera	0(0)	0	50(10)	5	0(0)	0	68(0)	7
Oecetis	0(0)	0	181(0)	19	0(0)	0	245(59)	26
T. Trichoptera	0(0)	0	181(0)	19	0(0)	0	245(59)	26
Chaoboridae	0(0)	0	211(30)	22	34(17)	2	0(0)	0
Chironomidae	178(27)	8	231(30)	24	94(60)	6	448(42)	48
Total benthos w/o *Hydra*	554(145)	31	825(80)	85	290(51)	19	853(194)	92
Total benthos	1771(544)	-	966(60)	-	1533(256)	-	929(186)	-
R. smelt larvae	43(11)	73	70(30)	88	119(17)	93	17(17)	50
Burbot larvae	5(5)	9	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	11(11)	18	10(10)	12	9(9)	7	17(17)	50
Total fish larvae	59(5)	-	80(40)	-	128(26)	-	34(34)	-
Total zooplankton	226(7)	-	102(7)	-	136(17)	-	102(8)	-

Appendix 32. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	353(44)	39	40(40)	2	-	-	-	-
Naididae	206(88)	23	302(201)	13	-	-	-	-
Enchtraeidae	22(22)	2	0(0)	0	-	-	-	-
Mysis relicta	7(7)	1	0(0)	0	-	-	-	-
Hydracarina	0(0)	0	10(10)	<1	-	-	-	-
Stenacron	0(0)	0	10(10)	<1	-	-	-	-
Eurylophella	0(0)	0	10(10)	<1	-	-	-	-
Hexagenia	0(0)	0	10(10)	<1	-	-	-	-
T. Ephemeroptera	0(0)	0	30(10)	1	-	-	-	-
Polycentropus	0(0)	0	10(10)	<1	-	-	-	-
Hydroptila	0(0)	0	20(20)	1	-	-	-	-
Oecetis	0(0)	0	151(50)	7	-	-	-	-
T. Trichoptera	0(0)	0	181(60)	8	-	-	-	-
Chaoboridae	0(0)	0	91(10)	4	-	-	-	-
Chironomidae	324(29)	35	1620(231)	71	-	-	-	-
Total benthos w/o *Hydra*	560(44)	61	2233(20)	98	-	-	-	-
Total benthos	913(88)	-	2274(60)	-	-	-	-	-
R. smelt larvae	133(15)	100	161(20)	94	-	-	-	-
Missing larvae	0(0)	0	10(10)	6	-	-	-	-
Total fish larvae	133(15)	-	171(10)	-	-	-	-	-
Total zooplankton	366(20)	-	318(38)	-	-	-	-	-

Appendix 33. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1620(42)	70	31(10)	3	1789(589)	72	26(9)	4
Turbellaria	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Naididae	437(14)	19	104(21)	11	488(244)	20	9(9)	1
Tubificidae	0(0)	0	0(0)	0	20(20)	1	0(0)	0
Polychaeta	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	10(10)	1	0(0)	0	9(9)	1
Hydracarina	7(7)	<1	10(10)	1	0(0)	0	0(0)	0
Stenacron	0(0)	0	0(0)	0	0(0)	0	9(9)	1
Eurylophella	0(0)	0	10(10)	1	0(0)	0	9(9)	1
Caenis	0(0)	0	10(10)	1	0(0)	0	17(0)	2
Baetisca	0(0)	0	10(10)	1	0(0)	0	9(9)	1
Ephemera	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Hexagenia	0(0)	0	10(10)	1	0(0)	0	44(44)	6
T. Ephemeroptera	0(0)	0	52(10)	6	0(0)	0	87(52)	12
Lestes	7(7)	<1	0(0)	0	0(0)	0	0(0)	0
Nyctiophylax	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Polyplectron	0(0)	0	0(0)	0	0(0)	0	9(9)	1
Oxythira	0(0)	0	0(0)	0	0(0)	0	9(9)	1
Mystacides	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Oecetis	0(0)	0	135(31)	15	10(10)	<1	297(17)	40
T. Trichoptera	0(0)	0	156(52)	17	10(10)	<1	315(17)	43
Chaoboridae	0(0)	0	239(73)	26	41(41)	2	0(0)	0
Simuliidae	0(0)	0	10(10)	1	0(0)	0	0(0)	0
Chironomidae	246(63)	11	239(94)	26	142(42)	6	288(9)	39
Valvata sincera	0(0)	0	10(10)	1	0(0)	0	0(0)	0
T. Gastropoda	0(0)	0	10(10)	1	0(0)	0	0(0)	0

Appendix 33. Continued.

	Frechette Point Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Pisidium	0(0)	0	21(21)	2	0(0)	0	0(0)	0
Total benthos w/o *Hydra*	697(77)	30	873(83)	97	701(356)	28	708(26)	96
Total benthos	2317(35)	-	904(94)	-	2490(945)	-	734(35)	-
R. smelt larvae	56(14)	100	31(10)	75	20(20)	67	9(9)	50
Burbot larvae	0(0)	0	0(0)	0	10(10)	33	0(0)	0
Damaged larvae	0(0)	0	10(10)	25	0(0)	0	9(9)	50
Total fish larvae	56(14)	-	42(21)	-	30(30)	-	17(0)	-
Total zooplankton	176(7)	-	33(1)	-	103(4)	-	38(5)	-

Appendix 34. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	896(472)	55	125(-)	8	-	-	-	-
Naididae	385(308)	24	416(-)	26	-	-	-	-
Hydroptila	0(0)	0	21(-)	1	-	-	-	-
Oecetis	0(0)	0	125(-)	8	-	-	-	-
T. Trichoptera	0(0)	0	146(-)	9	-	-	-	-
Chironomidae	347(96)	21	894(-)	57	-	-	-	-
Total benthos w/o Hydra	732(405)	45	1455(-)	92	-	-	-	-
Total benthos	1628(877)	-	1580(-)	-	-	-	-	-
R. smelt larvae	106(48)	92	62(-)	100	-	-	-	-
Missing larvae	10(10)	8	0(-)	0	-	-	-	-
Total fish larvae	116(39)	-	62(-)	-	-	-	-	-
Total zooplankton	255(0)	-	122(-)	-	-	-	-	-

Appendix 35. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	430(176)	80	156(16)	43	769(727)	85	24(24)	21
Naididae	20(4)	4	16(16)	4	14(0)	2	16(16)	14
Enchytraeidae	0(0)	0	8(8)	2	7(7)	1	0(0)	0
Polychaeta	4(4)	1	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	4(4)	1	23(8)	6	7(7)	1	8(8)	7
Hyalella azteca	0(0)	0	0(0)	0	7(7)	1	0(0)	0
T. Amphipoda	0(0)	0	0(0)	0	7(7)	1	0(0)	0
Hydracarina	0(0)	0	0(0)	0	7(7)	1	8(8)	7
Collembola	0(0)	0	0(0)	0	7(7)	1	0(0)	0
Hexagenia	0(0)	0	8(8)	2	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	8(8)	2	0(0)	0	0(0)	0
Hydropysche	0(0)	0	31(0)	9	0(0)	0	0(0)	0
Oecetis	0(0)	0	63(31)	17	7(7)	1	16(0)	14
T. Trichoptera	0(0)	0	94(31)	26	7(7)	1	16(0)	14
Lepidoptera	0(0)	0	0(0)	0	7(7)	1	0(0)	0
Chironomidae	82(41)	15	63(16)	17	69(14)	8	40(24)	36
Total benthos w/o Hydra	111(45)	20	211(39)	57	132(48)	15	88(24)	79
Total benthos	541(221)	-	368(23)	-	900(776)	-	112(48)	-

Appendix 35. Continued.

	Frechette Point Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	57(57)	87	31(16)	100	42(28)	86	48(16)	86
Burbot larvae	8(0)	13	0(0)	0	7(7)	14	0(0)	0
Damaged larvae	0(0)	0	0(0)	0	0(0)	0	8(8)	14
Total fish larvae	66(57)	-	31(16)	-	48(35)	-	56(8)	-
R. smelt eggs	4(4)	50	8(8)	100	14(14)	67	0(0)	0
Unid. eggs	4(4)	50	0(0)	0	7(7)	33	0(0)	0
Total fish eggs	8(0)	-	8(8)	-	21(21)	-	0(0)	0
Total zooplankton	356(19)	-	305(26)	-	153(124)	-	141(12)	-

Appendix 36. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1063(329)	66	274(117)	32	-	-	-	-
Naididae	61(61)	4	16(16)	2	-	-	-	-
Enchytraeidae	0(0)	0	8(8)	1	-	-	-	-
Heptageniidae	0(0)	0	8(8)	1	-	-	-	-
Caenis	8(8)	<1	0(0)	0	-	-	-	-
T. Ephemeroptera	8(8)	<1	8(8)	1	-	-	-	-
Oecetis	0(0)	0	16(16)	2	-	-	-	-
T. Trichoptera	0(0)	0	16(16)	2	-	-	-	-
Chironomidae	474(92)	30	532(47)	62	-	-	-	-
Total benthos w/o *Hydra*	543(38)	34	579(31)	68	-	-	-	-
Total benthos	1606(291)	-	853(14)	-	-	-	-	-
R. smelt larvae	145(8)	90	211(102)	84	-	-	-	-
Burbot larvae	15(15)	10	0(0)	0	-	-	-	-
Damaged larvae	0(0)	0	39(39)	16	-	-	-	-
Total fish larvae	161(23)	-	250(63)	-	-	-	-	-
R. smelt eggs	15(15)	100	0(0)	0	-	-	-	-
Total fish eggs	15(15)	100	0(0)	0	-	-	-	-
Total zooplankton	888(9)	-	654(87)	-	-	-	-	-

Appendix 37. Mean density ($\bar{X}$), standard error (SE), and ercentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1067(681)	82	85(9)	17	1592(1269)	81	212(193)	67
Naididae	76(0)	6	28(28)	6	129(52)	7	19(0)	6
Tubificidae	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Enchytraeidae	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Mysis relicta	4(4)	<1	38(0)	8	6(6)	<1	0(0)	0
Hydracarina	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Stenacron	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Eurylophella	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Caenis	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Hexagenia	0(0)	0	0(0)	0	0(0)	0	10(10)	3
T. Ephemeroptera	0(0)	0	28(28)	6	0(0)	0	10(10)	3
Corixidae	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Polyplectron	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Hydropsyche	0(0)	0	19(19)	4	0(0)	0	0(0)	0
Symphitopsyche	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Ceraclea	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Oecetis	0(0)	0	47(28)	10	0(0)	0	19(19)	6
T. Trichoptera	11(4)	1	66(9)	13	0(0)	0	19(19)	6
Chaoboridae	0(0)	0	9(9)	2	0(0)	0	0(0)	0
Chironomidae	132(19)	10	208(19)	42	238(32)	12	58(19)	18
Total benthos w/o *Hydra*	227(15)	18	406(66)	83	374(90)	19	106(10)	33
Total benthos	1294(666)	-	491(76)	-	1965(1360)	-	318(202)	-

Appendix 37. Continued.

	Frechette Point Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	155(11)	93	0(0)	0	129(52)	83	96(77)	100
Burbot larvae	11(4)	7	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	0(0)	0	28(28)	100	26(13)	17	0(0)	0
Total fish larvae	166(8)	-	28(28)	-	155(39)	-	96(77)	-
R. smelt eggs	8(0)	100	0(0)	0	19(6)	100	0(0)	0
Total fish eggs	8(0)	-	0(0)	0	19(6)	-	0(0)	0
Total zooplankton	537(77)	-	288(99)	-	252(81)	-	101(4)	-

Appendix 38. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	982(106)	63	454(397)	29	-	-	-	-
Turbellaria	0(0)	0	9(9)	1	-	-	-	-
Naididae	85(0)	5	104(85)	7	-	-	-	-
Collembola	7(7)	<1	0(0)	0	-	-	-	-
<u>Stenonema</u>	0(0)	0	9(9)	1	-	-	-	-
<u>Hexagenia</u>	0(0)	0	9(9)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	19(0)	1	-	-	-	-
<u>Oecetis</u>	0(0)	0	19(19)	1	-	-	-	-
T. Trichoptera	0(0)	0	19(19)	1	-	-	-	-
Chironomidae	487(78)	31	945(57)	51	-	-	-	-
Total benthos w/o <u>Hydra</u>	579(71)	37	1096(19)	71	-	-	-	-
Total benthos	1561(35)	-	1550(416)	-	-	-	-	-
R. smelt larvae	148(35)	91	198(198)	72	-	-	-	-
Burbot larvae	14(0)	9	0(0)	0	-	-	-	-
Missing larvae	0(0)	0	76(76)	28	-	-	-	-
Total fish larvae	162(35)	-	274(123)	-	-	-	-	-
R. smelt eggs	7(7)	100	0(0)	0	-	-	-	-
Total fish eggs	7(7)	-	0(0)	-	-	-	-	-
Total zooplankton	555(116)	-	647(94)	-	-	-	-	-

Appendix 39. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	968(566)	70	269(179)	43	4041(1065)	81	320(320)	43
Turbellaria	0(0)	0	0(0)	0	0(0)	0	11(11)	2
Naididae	80(8)	6	56(56)	9	553(260)	11	46(46)	6
Tubificidae	8(0)	1	0(0)	0	0(0)	0	0(0)	0
Enchytraeidae	0(0)	0	0(0)	0	8(8)	<1	0(0)	0
Mysis relicta	4(4)	<1	0(0)	0	0(0)	0	0(0)	0
Hydracarina	4(4)	<1	0(0)	0	8(8)	<1	11(11)	2
Collembola	0(0)	0	11(11)	2	0(0)	0	0(0)	0
Stenacron	4(4)	<1	11(11)	2	8(8)	<1	0(0)	0
Eurylophella	0(0)	0	11(11)	2	0(0)	0	0(0)	0
Caenis	0(0)	0	11(11)	2	0(0)	0	0(0)	0
Hexagenia	0(0)	0	11(11)	2	0(0)	0	11(11)	2
T. Ephemeroptera	4(4)	<1	45(22)	7	8(8)	<1	11(11)	2
Cyrnellus	12(12)	1	0(0)	0	0(0)	0	0(0)	0
Hydropsyche	0(0)	0	11(11)	2	8(8)	<1	23(23)	3
Oxythira	0(0)	0	0(0)	0	0(0)	0	11(11)	2
Oecetis	0(0)	0	101(78)	16	8(8)	<1	103(57)	14
T. Trichoptera	12(12)	1	112(67)	18	16(0)	<1	137(46)	18
Simuliidae	0(0)	0	0(0)	0	0(0)	0	11(11)	2
Chironomidae	309(100)	22	135(67)	21	341(16)	7	194(34)	26
Total benthos w/o *Hydra*	422(92)	30	359(224)	57	935(268)	19	422(80)	57
Total benthos	1390(659)	-	628(404)	-	4976(1333)	-	742(400)	-

Appendix 39. Continued.

Taxon	Frechette Point Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	84(20)	84	56(56)	83	179(16)	88	34(11)	75
Yellow perch	4(4)	4	0(0)	0	0(0)	0	0(0)	0
Burbot larvae	8(8)	8	0(0)	0	8(8)	4	0(0)	0
Four-horned sculpin	4(4)	4	11(11)	17	0(0)	0	0(0)	0
Damaged larvae	0(0)	0	0(0)	0	16(16)	8	11(11)	25
Total fish larvae	100(20)	-	67(45)	-	203(8)	-	46(23)	-
R. smelt eggs	20(12)	63	11(11)	100	41(8)	83	0(0)	0
Unid. eggs	12(12)	37	0(0)	0	8(8)	17	0(0)	0
Total fish eggs	32(24)	-	11(11)	-	49(16)	-	0(0)	-
Total zooplankton	240(5)	-	197(99)	-	330(52)	-	73(<1)	-

Appendix 40. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1512(90)	68	493(269)	29	-	-	-	-
Turbellaria	0(0)	0	11(11)	1	-	-	-	-
Naididae	187(22)	8	112(0)	6	-	-	-	-
Tubificidae	7(7)	<1	0(0)	0	-	-	-	-
S. heringianus	7(7)	<1	0(0)	0	-	-	-	-
Mysis relicta	7(7)	<1	11(11)	1	-	-	-	-
Polyplectron	0(0)	0	11(11)	1	-	-	-	-
Oecetis	0(0)	0	67(22)	4	-	-	-	-
T. Trichoptera	0(0)	0	78(11)	5	-	-	-	-
Ceratopogonidae	0(0)	0	11(11)	1	-	-	-	-
Chironomidae	487(52)	22	1009(67)	58	-	-	-	-
Total benthos w/o *Hydra*	696(97)	32	1233(112)	71	-	-	-	-
Total benthos	2208(7)	-	1727(157)	-	-	-	-	-
R. smelt larvae	337(22)	100	202(67)	95	-	-	-	-
Missing larvae	0(0)	0	11(11)	5	-	-	-	-
Total fish larvae	337(22)	-	213(78)	-	-	-	-	-
Total zooplankton	796(18)	-	763(6)	-	-	-	-	-

Appendix 41. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	1841(26)	68	19(19)	5	3980(176)	89	57(57)	27
Naididae	192(166)	7	0(0)	0	264(88)	6	0(0)	0
Tubificidae	204(0)	8	0(0)	0	0(0)	0	0(0)	0
Hirudinea	13(13)	<1	0(0)	0	0(0)	0	0(0)	0
<u>Asellus</u>	26(26)	1	0(0)	0	0(0)	0	0(0)	0
<u>Lirceus</u>	51(51)	2	38(38)	10	0(0)	0	0(0)	0
<u>Hyalella azteca</u>	64(38)	2	0(0)	0	0(0)	0	0(0)	0
T. Amphipoda	64(38)	2	0(0)	0	0(0)	0	0(0)	0
<u>Stenonema</u>	0(0)	0	19(19)	5	0(0)	0	0(0)	0
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	19(19)	9
T. Ephemeroptera	0(0)	0	19(19)	5	0(0)	0	19(19)	9
<u>Polycentropus</u>	26(26)	1	0(0)	0	0(0)	0	0(0)	0
<u>Polyplectron</u>	0(0)	0	19(19)	5	0(0)	0	0(0)	0
<u>Hydropsyche</u>	0(0)	0	19(19)	5	0(0)	0	38(38)	18
T. Trichoptera	26(26)	1	38(0)	10	0(0)	0	38(38)	18
Chironomidae	269(115)	10	286(19)	71	252(76)	6	95(57)	45
<u>Valvata sincera</u>	13(13)	<1	0(0)	0	0(0)	0	0(0)	0
T. Gastropoda	13(13)	<1	0(0)	0	0(0)	0	0(0)	0
Total benthos w/o <u>Hydra</u>	857(448)	32	382(38)	95	516(164)	11	153(0)	73
Total benthos	2698(422)	-	401(57)	-	4496(340)	-	210(57)	-

Appendix 41. Continued.

	Frechette Point Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	166(38)	87	76(76)	50	227(0)	78	38(38)	100
Burbot larvae	25(0)	13	0(0)	0	38(13)	13	0(0)	0
Missing larvae	0(0)	0	76(38)	50	25(25)	9	0(0)	0
Total fish larvae	192(38)	-	153(76)	-	290(38)	-	38(38)	-
R. smelt eggs	26(0)	67	0(0)	0	0(0)	0	0(0)	0
Unid. eggs	13(12)	33	0(0)	0	0(0)	0	0(0)	0
Total fish eggs	38(12)	-	0(0)	0	0(0)	0	0(0)	0
Total zooplankton	195(35)	-	240(106)	-	230(14)	-	182(18)	-

Appendix 42. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	828(419)	53	39(39)	4	-	-	-	-
Naididae	125(11)	8	58(58)	7	-	-	-	-
Tubificidae	34(11)	2	0(0)	0	-	-	-	-
Ephemera	0(0)	0	39(0)	4	-	-	-	-
T. Ephemeroptera	0(0)	0	39(0)	4	-	-	-	-
Polycentropus	0(0)	0	39(0)	4	-	-	-	-
Hydropsyche	0(0)	0	19(19)	2	-	-	-	-
T. Trichoptera	0(0)	0	58(19)	7	-	-	-	-
Ceratopogonidae	0(0)	0	19(19)	2	-	-	-	-
Chironomidae	567(159)	36	659(116)	76	-	-	-	-
Total benthos w/o *Hydra*	726(159)	47	833(97)	96	-	-	-	-
Total benthos	1553(578)	-	872(136)	-	-	-	-	-
R. smelt larvae	34(11)	60	194(0)	63	-	-	-	-
Burbot larvae	11(11)	20	0(0)	0	-	-	-	-
Missing larvae	11(11)	20	116(116)	37	-	-	-	-
Total fish larvae	57(11)	-	310(116)	-	-	-	-	-
Total zooplankton	285(103)	-	532(105)	-	-	-	-	-

Appendix 43. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1324(689)	78	181(144)	27	4222(1018)	81	54(54)	25
Turbellaria	0(0)	0	18(18)	3	0(0)	0	0(0)	0
Naididae	98(65)	6	72(36)	11	434(75)	8	18(18)	8
Tubificidae	82(49)	5	0(0)	0	15(15)	<1	0(0)	0
Mysis relicta	0(0)	0	0(0)	0	15(15)	<1	0(0)	0
Lirceus	16(16)	1	0(0)	0	0(0)	0	0(0)	0
Hyalella azteca	49(16)	3	0(0)	0	15(15)	<1	0(0)	0
T. Amphipoda	49(16)	3	0(0)	0	15(15)	<1	0(0)	0
Hydracarina	0(0)	0	18(18)	3	15(15)	<1	0(0)	0
Alloperla	0(0)	0	18(18)	3	0(0)	0	0(0)	0
Stenacron	0(0)	0	0(0)	0	0(0)	0	18(18)	8
Stenonema	0(0)	0	18(18)	3	0(0)	0	0(0)	0
Caenis	0(0)	0	18(18)	3	0(0)	0	0(0)	0
Ephemera	0(0)	0	18(18)	3	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	54(18)	8	0(0)	0	18(18)	8
Hydropsyche	0(0)	0	36(0)	5	0(0)	0	18(18)	8
Oecetis	0(0)	0	0(0)	0	0(0)	0	18(18)	8
T. Trichoptera	0(0)	0	36(0)	5	0(0)	0	36(0)	17
Chironomidae	131(65)	8	271(18)	41	479(240)	9	90(18)	42
Total benthos w/o *Hydra*	376(49)	22	487(54)	73	973(165)	19	162(18)	75
Total benthos	1699(719)	-	668(199)	-	5195(853)	-	217(72)	-

Appendix 43. Continued.

	Frechette Point Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	82(16)	100	90(18)	100	90(0)	86	72(72)	44
Damaged larvae	0(0)	0	0(0)	0	15(15)	14	90(18)	56
Total fish larvae	82(16)	-	90(18)	-	105(15)	-	162(90)	-
R. smelt eggs	16(16)	100	0(0)	0	0(0)	0	0(0)	0
Total fish eggs	16(16)	-	0(0)	0	0(0)	0	0(0)	0
Total zooplankton	301(161)	-	175(52)	-	199(10)	-	73(6)	-

Appendix 44. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1058(797)	50	92(92)	6	-	-	-	-
Turbellaria	14(14)	1	0(0)	0	-	-	-	-
Naididae	362(246)	17	110(0)	8	-	-	-	-
Tubificidae	116(29)	5	0(0)	0	-	-	-	-
Enchytraeidae	29(0)	1	0(0)	0	-	-	-	-
Polychaeta	29(0)	1	0(0)	0	-	-	-	-
Hyalella azteca	0(0)	0	18(18)	1	-	-	-	-
T. Amphipoda	0(0)	0	18(18)	1	-	-	-	-
Hydracarina	14(14)	1	0(0)	0	-	-	-	-
Ephemera	0(0)	0	37(37)	3	-	-	-	-
T. Ephemeroptera	0(0)	0	37(37)	3	-	-	-	-
Oecetis	29(29)	1	0(0)	0	-	-	-	-
T. Trichoptera	29(29)	1	0(0)	0	-	-	-	-
Ceratopogonidae	0(0)	0	18(18)	1	-	-	-	-
Chironomidae	435(87)	21	1158(92)	81	-	-	-	-
Pisidium	29(29)	1	0(0)	0	-	-	-	-
Total benthos w/o *Hydra*	1058(304)	50	1342(55)	94	-	-	-	-
Total benthos	2116(1101)	-	1434(37)	-	-	-	-	-

Appendix 44. Continued.

	Frechette Point Summer - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	14(14)	50	202(92)	92	-	-	-	-
Burbot larvae	14(14)	50	0(0)	0	-	-	-	-
Missing larvae	0(0)	0	18(18)	8	-	-	-	-
Total fish larvae	29(29)	-	221(74)	-	-	-	-	-
R. smelt eggs	14(14)	100	0(0)	0	-	-	-	-
Total fish eggs	14(14)	-	0(0)	0	-	-	-	-
Total zooplankton	893(596)	-	300(119)	-	-	-	-	-

Appendix 45. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	1371(1163)	74	489(142)	57	3393(333)	89	11(11)	5
Naididae	47(9)	3	63(32)	7	55(55)	1	0(0)	0
Tubificidae	9(9)	1	0(0)	0	11(11)	<1	0(0)	0
Enchytraeidae	0(0)	0	0(0)	0	11(11)	<1	0(0)	0
Mysis relicta	9(9)	1	0(0)	0	0(0)	0	11(11)	5
Hydracarina	19(0)	1	0(0)	0	22(22)	1	0(0)	0
Baetis	0(0)	0	0(0)	0	0(0)	0	11(11)	5
Stenacron	0(0)	0	16(16)	2	0(0)	0	11(11)	5
Eurylophella	0(0)	0	32(0)	4	0(0)	0	11(11)	5
Ephemera	0(0)	0	16(16)	2	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	63(0)	7	0(0)	0	32(32)	16
Polyplectron	0(0)	0	0(0)	0	0(0)	0	11(11)	5
Hydropsyche	0(0)	0	32(32)	4	0(0)	0	21(0)	11
Oecetis	0(0)	0	16(16)	2	0(0)	0	11(11)	5
T. Trichoptera	0(0)	0	47(47)	6	0(0)	0	43(21)	21
Chironomidae	397(113)	21	189(63)	22	322(55)	8	107(21)	53
Pisidium	9(9)	1	0(0)	0	0(0)	0	0(0)	0
Total benthos w/o *Hydra*	491(132)	26	363(79)	43	421(111)	11	192(0)	95
Total benthos	1862(1030)	-	852(221)	-	3814(222)	-	203(11)	-

Appendix 45. Continued.

	Frechette Point Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	57(19)	76	16(16)	25	89(22)	89	21(21)	100
Burbot larvae	9(9)	12	16(16)	25	11(11)	11	0(0)	0
Damaged larvae	9(9)	12	31(0)	50	0(0)	0	0(0)	0
Total fish larvae	76(19)	-	63(32)	-	100(11)	-	21(21)	-
R. smelt eggs	9(9)	100	0(0)	0	0(0)	0	0(0)	0
Total fish eggs	9(9)	-	0(0)	0	0(0)	0	0(0)	0
Total zooplankton	315(56)	-	183(10)	-	166(14)	-	111(11)	-

Appendix 46. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	2441(625)	75	580(109)	52	3690(491)	88	12(12)	5
Turbellaria	12(12)	<1	0(0)	0	0(0)	0	0(0)	0
Naididae	318(200)	10	145(36)	13	88(13)	2	0(0)	0
Tubificidae	47(0)	1	0(0)	0	13(13)	<1	0(0)	0
Enchytraeidae	0(0)	0	0(0)	0	25(0)	1	0(0)	0
Polychaeta	12(12)	<1	0(0)	0	0(0)	0	0(0)	0
Hirudinea	0(0)	0	18(18)	2	0(0)	0	0(0)	0
<u>Mysis relicta</u>	12(12)	<1	0(0)	0	0(0)	0	0(0)	0
<u>Hyalella azteca</u>	24(24)	1	0(0)	0	0(0)	0	12(12)	5
T. Amphipoda	24(24)	1	0(0)	0	0(0)	0	12(12)	5
Hydracarina	24(24)	1	18(18)	2	13(13)	<1	12(12)	5
Collembola	0(0)	0	0(0)	0	13(13)	<1	0(0)	0
<u>Stenacron</u>	0(0)	0	36(0)	3	0(0)	0	0(0)	0
Leptoplebiidae	0(0)	0	0(0)	0	0(0)	0	12(12)	5
<u>Ephemera</u>	0(0)	0	0(0)	0	13(13)	<1	12(12)	5
T. Ephemeroptera	0(0)	0	36(0)	3	13(13)	<1	25(0)	9
<u>Polyplectron</u>	0(0)	0	18(18)	2	0(0)	0	12(12)	5
<u>Hydropsyche</u>	0(0)	0	36(0)	3	13(13)	<1	12(12)	5
<u>Oecetis</u>	0(0)	0	18(18)	2	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	72(36)	7	13(13)	<1	25(25)	9
Lepidoptera	0(0)	0	0(0)	0	13(13)	<1	0(0)	0
Chironomidae	342(11)	11	236(18)	21	302(25)	7	184(86)	68
<u>Pisidium</u>	24(24)	1	0(0)	0	0(0)	0	0(0)	0
Total benthos w/o <u>Hydra</u>	814(248)	25	525(18)	48	491(38)	12	257(135)	95
Total benthos	3255(873)	-	1105(91)	-	4181(529)	-	270(147)	-

Appendix 46. Continued.

	Frechette Point Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	59(59)	83	145(36)	62	63(38)	100	37(12)	75
Burbot larvae	12(12)	17	36(36)	15	0(0)	0	0(0)	0
Damaged larvae	0(0)	0	54(54)	23	0(0)	0	12(12)	25
Total fish larvae	71(47)	-	236(127)	-	63(38)	-	49(25)	-
R. smelt eggs	35(12)	100	0(0)	0	25(25)	100	0(0)	0
Total fish eggs	35(12)	-	0(0)	0	25(25)	100	0(0)	0
Total zooplankton	254(3)	-	168(12)	-	143(8)	-	44(4)	-

Appendix 47. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Frechette Point Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	1710(348)	77	60(20)	16	2394(28)	87	12(12)	2
Naididae	14(14)	1	20(20)	5	85(28)	3	0(0)	0
Tubificidae	0(0)	0	0(0)	0	14(14)	1	0(0)	0
Enchytraeidae	43(43)	2	0(0)	0	14(14)	1	0(0)	0
<u>Hyalella azteća</u>	87(58)	4	0(0)	0	14(14)	1	25(25)	3
T. Amphipoda	87(58)	4	0(0)	0	14(14)	1	25(25)	3
Hydracarina	72(43)	3	20(20)	5	28(28)	1	49(25)	6
Collembola	0(0)	0	0(0)	0	14(14)	1	0(0)	0
<u>Stenonema</u>	0(0)	0	0(0)	0	0(0)	0	12(12)	2
<u>Eurylophella</u>	0(0)	0	20(20)	5	0(0)	0	0(0)	0
<u>Caenis</u>	14(14)	1	81(40)	21	28(28)	1	491(246)	61
<u>Baetisca</u>	0(0)	0	40(40)	11	0(0)	0	12(12)	2
<u>Ephemera</u>	0(0)	0	40(40)	11	14(14)	1	49(25)	6
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	25(0)	3
T. Ephemeroptera	14(14)	1	181(20)	47	42(42)	2	590(270)	73
<u>Polyplectron</u>	0(0)	0	20(20)	5	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	20(20)	5	0(0)	0	0(0)	0
Ceratopogonidae	0(0)	0	0(0)	0	0(0)	0	25(0)	3
Chironomidae	116(0)	5	81(0)	21	141(28)	5	111(12)	14
<u>Valvata tricarinata</u>	43(14)	2	0(0)	0	0(0)	0	0(0)	0
<u>Amnicola limosa</u>	72(14)	3	0(0)	0	0(0)	0	0(0)	0
<u>Gyraulus</u>	29(29)	1	0(0)	0	0(0)	0	0(0)	0
<u>Helisoma trivolvus</u>	14(14)	1	0(0)	0	0(0)	0	0(0)	0
T. Gastropoda	159(43)	7	0(0)	0	0(0)	0	0(0)	0
<u>Pisidium</u>	14(14)	1	0(0)	0	0(0)	0	0(0)	0

Appendix 47. Continued.

	Frechette Point Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Total benthos w/o Hydra	522(0)	23	323(40)	84	352(42)	13	799(332)	98
Total benthos	2232(348)	-	383(20)	-	2747(70)	-	811(319)	-
R. smelt larvae	29(29)	100	40(0)	100	0(0)	0	61(61)	56
Burbot larvae	0(0)	0	0(0)	0	14(14)	100	0(0)	0
Damaged larvae	0(0)	0	0(0)	0	0(0)	0	49(0)	44
Total fish larvae	29(29)	-	40(0)	-	14(14)	-	111(61)	-
Total zooplankton	279(29)	-	164(6)	-	112(8)	-	251(139)	-

Appendix 48. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	138(0)	89	0(0)	0	105(10)	73
Gammarus	0(0)	0	9(9)	6	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	9(9)	6	0(0)	0	0(0)	0
Leptophlebia	0(0)	0	0(0)	0	0(0)	0	10(10)	7
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	10(10)	7
Chironomidae	0(0)	0	9(9)	6	0(0)	0	29(29)	20
Total benthos	0(0)	-	155(0)	-	0(0)	-	143(29)	-
Total zooplankton	538(22)	-	370(31)	-	499(51)	-	312(8)	-

Appendix 49. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	28(28)	100	0(0)	0	8(8)	100
Total benthos	0(0)	-	28(28)	-	0(0)	-	8(8)	-
Total zooplankton	441(22)	-	538(91)	-	335(138)	-	464(60)	-

Appendix 50. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	23(8)	100	0(0)	0	9(9)	50
Chironomidae	0(0)	0	0(0)	0	0(0)	0	9(9)	50
Total benthos	0(0)	-	23(8)	-	0(0)	-	17(17)	-
Total zooplankton	374(235)	-	294(57)	-	214(9)	-	177(5)	-

Appendix 51. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	4(4)	100	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	46(8)	60	0(0)	0	21(21)	62
Chironomidae	0(0)	0	30(15)	40	0(0)	0	12(4)	38
Total benthos w/o *Hydra*	0(0)	0	76(23)	100	0(0)	0	33(25)	100
Total benthos	4(4)	-	76(23)	-	0(0)	-	33(25)	-
Total zooplankton	546(124)	-	338(40)	-	599(265)	-	412(117)	-

Appendix 52. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	4(4)	33	0(0)	0	-	-	-	-
Mysis relicta	0(0)	0	32(8)	44	-	-	-	-
Chironomidae	9(9)	67	40(0)	56	-	-	-	-
Total benthos w/o *Hydra*	9(9)	67	73(8)	100	-	-	-	-
Total benthos	13(4)	-	73(8)	-	-	-	-	-
Total zooplankton	1059(17)	-	728(175)	-	-	-	-	-

Appendix 53. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Turbellaria	5(5)	100	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	31(22)	54	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	0(0)	0	0(0)	0	5(5)	14
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	5(5)	14
Chironomidae	0(0)	0	26(0)	46	0(0)	0	29(0)	86
Total benthos	5(5)	-	57(22)	-	0(0)	-	33(5)	-
Total zooplankton	520(107)	-	325(199)	-	335(16)	-	198(28)	-

Appendix 54. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	19(0)	24	-	-	-	-
Chironomidae	10(10)	100	61(14)	76	-	-	-	-
Total benthos	10(10)	-	80(14)	-	-	-	-	-
Total *zooplankton*	804(99)	-	352(123)	-	-	-	-	-

Appendix 55. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	9(3)	75	0(0)	0	7(0)	67
Chironomidae	0(0)	0	3(3)	25	0(0)	0	3(3)	33
Total benthos	0(0)	-	12(6)	-	0(0)	-	10(3)	-
Total zooplankton	1042(88)	-	534(60)	-	632(93)	-	438(26)	-

Appendix 56. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	19(13)	32	-	-	-	-
Chironomidae	3(3)	100	41(3)	68	-	-	-	-
Total benthos	3(3)	-	60(16)	-	-	-	-	-
Total zooplankton	1524(187)	-	1887(36)	-	-	-	-	-

Appendix 57. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	15(3)	83	0(0)	0	0(0)	0	0(0)	0
Naididae	3(3)	17	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	21(11)	44	0(0)	0	15(9)	56
Hexagenia	0(0)	0	3(3)	6	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	3(3)	6	0(0)	0	0(0)	0
Chironomidae	0(0)	0	24(3)	50	0(0)	0	12(0)	44
Total benthos w/o *Hydra*	3(3)	17	47(16)	100	0(0)	0	26(9)	100
Total benthos	18(6)	-	47(16)	-	0(0)	-	26(9)	-
Total zooplankton	555(11)	-	460(16)	-	549(167)	-	347(7)	-

Appendix 58. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	3(3)	3	-	-	-	-
Mysis relicta	0(0)	0	14(3)	13	-	-	-	-
Chironomidae	11(6)	100	91(8)	85	-	-	-	-
Total benthos w/o *Hydra*	11(6)	100	104(11)	97	-	-	-	-
Total benthos	11(6)	-	107(14)	-	-	-	-	-
Total zooplankton	1373(76)	-	1428(13)	-	-	-	-	-

Appendix 59. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	9(9)	100	8(3)	14	3(3)	50	3(3)	5
Mysis relicta	0(0)	0	8(3)	14	0(0)	0	9(3)	15
Lirceus	0(0)	0	0(0)	0	0(0)	0	3(3)	5
Hyalella azteca	0(0)	0	5(5)	10	0(0)	0	3(3)	5
T. Amphipoda	0(0)	0	5(5)	10	0(0)	0	3(3)	5
Leptophlebia	0(0)	0	3(3)	5	0(0)	0	0(0)	0
Hexagenia	0(0)	0	0(0)	0	3(3)	50	0(0)	0
T. Ephemeroptera	0(0)	0	3(3)	5	3(3)	50	0(0)	0
Chironomidae	0(0)	0	32(5)	57	0(0)	0	41(6)	70
Total benthos w/o *Hydra*	0(0)	0	47(5)	86	3(3)	50	56(3)	95
Total benthos	9(9)	-	55(8)	-	6(0)	-	58(6)	-
Total zooplankton	104(11)	-	356(54)	-	62(1)	-	262(30)	-

Appendix 60. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	3(3)	7	14(3)	12	-	-	-	-
Naididae	3(3)	7	0(0)	0	-	-	-	-
Enchytraeidae	3(3)	7	0(0)	0	-	-	-	-
Mysis relicta	0(0)	0	5(0)	5	-	-	-	-
Pontoporeia hoyi	0(0)	0	3(3)	2	-	-	-	-
Hyalella azteca	0(0)	0	8(3)	7	-	-	-	-
T. Amphipoda	0(0)	0	11(0)	9	-	-	-	-
Chironomidae	31(8)	79	88(0)	74	-	-	-	-
Total benthos w/o *Hydra*	37(3)	93	104(0)	88	-	-	-	-
Total benthos	40(0)	-	118(3)	-	-	-	-	-
Total zooplankton	349(3)	-	443(55)	-	-	-	-	-

Appendix 61. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Mysis relicta</u>	0(0)	0	0(0)	0	0(0)	0	5(5)	100
Chironomidae	0(0)	0	6(6)	100	0(0)	0	0(0)	0
Total benthos	0(0)	-	6(6)	-	0(0)	-	5(5)	-
Total zooplankton	551(30)	-	348(5)	-	777(161)	-	568(<1)	-

Appendix 62. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Turbellaria	6(69	33	0(0)	0	-	-	-	-
Chironomidae	11(0)	67	11(0)	100	-	-	-	-
Total benthos	17(6)	-	11(0)	-	-	-	-	-
Total zooplankton	977(38)	-	716(47)	-	-	-	-	-

Appendix 63. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Leptophlebia</u>	0(0)	0	0(0)	0	0(0)	0	8(8)	100
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	8(8)	100
Chironomidae	0(0)	0	0(0)	0	4(4)	100	0(0)	0
Total benthos	0(0)	-	0(0)	-	4(4)	-	0(0)	-
Total zooplankton	494(7)	-	282(21)	-	1079(95)	-	445(43)	-

Appendix 64. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	37(9)	100	58(31)	100	-	-	-	-
Total benthos	37(9)	-	58(31)	-	-	-	-	-
Total zooplankton	920(253)	-	409(28)	-	-	-	-	-

Appendix 65. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	10(0)	33	0(0)	0	13(4)	38
Leptophlebia	0(0)	0	10(10)	33	0(0)	0	9(9)	25
Ephemera	0(0)	0	5(5)	17	5(5)	100	4(4)	13
T. Ephemeroptera	0(0)	0	15(5)	50	5(5)	100	13(13)	38
Chironomidae	0(0)	0	5(5)	17	0(0)	0	9(9)	25
Total benthos	0(0)	-	29(0)	-	5(5)	-	35(18)	-
Total zooplankton	180(23)	-	430(141)	-	319(85)	-	426(38)	-

Appendix 66. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 6 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Pontoporeia hoyi</u>	0(0)	0	5(5)	2	-	-	-	-
T. Amphipoda	0(0)	0	5(5)	2	-	-	-	-
Chironomidae	140(20)	100	210(44)	98	-	-	-	-
Total benthos	140(20)	-	215(39)	-	-	-	-	-
Total zooplankton	368(11)	-	355(48)	-	-	-	-	-

Appendix 67. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 7 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	12(12)	67	0(0)	0	6(6)	50
Chironomidae	0(0)	0	6(6)	33	0(0)	0	6(6)	50
Total benthos	0(0)	-	18(6)	-	0(0)	-	12(0)	-
Total zooplankton	295(58)	-	246(32)	-	313(<1)	-	282(90)	-

Appendix 68. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 7 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	6(6)	2	-	-	-	-
Chironomidae	57(11)	100	321(24)	98	-	-	-	-
Total benthos	57(11)	-	327(18)	-	-	-	-	-
Total zooplankton	486(32)	-	436(64)	-	-	-	-	-

Appendix 69. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Leptophlebia	0(0)	0	0(0)	0	0(0)	0	8(8)	17
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	8(8)	17
Chironomidae	0(0)	0	24(8)	100	0(0)	0	38(23)	83
Total benthos	0(0)	-	24(8)	-	0(0)	-	46(15)	-
Total zooplankton	291(52)	-	182(6)	-	281(24)	-	351(2)	-

Appendix 70. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 7 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	280(8)	100	385(118)	100	-	-	-	-
Total benthos	280(8)	-	385(118)	-	-	-	-	-
Total zooplankton	328(8)	-	256(11)	-	-	-	-	-

Appendix 71. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 8 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Leptophlebia	0(0)	0	17(0)	29	0(0)	0	60(9)	50
Hexagenia	0(0)	0	8(8)	14	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	25(8)	43	0(0)	0	60(9)	50
Chironomidae	0(0)	0	34(0)	57	15(15)	100	60(9)	50
Total benthos	0(0)	-	59(8)	-	15(15)	-	121(0)	-
Total zooplankton	497(32)	-	183(31)	-	230(33)	-	241(24)	-

Appendix 72. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 8 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Ear. instar Heptageniidae	0(0)	0	0(0)	0	8(8)	25	0(0)	0
Leptophlebia	0(0)	0	9(9)	100	0(0)	0	9(9)	11
T. Ephemeroptera	0(0)	0	9(9)	100	8(8)	25	9(9)	11
Chironomidae	8(8)	100	0(0)	0	24(8)	75	72(18)	89
Total benthos	8(8)	-	9(9)	-	32(16)	-	82(9)	-
Total zooplankton	216(41)	-	78(2)	-	177(11)	-	229(3)	-

Appendix 73. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Winter - Station 9 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Leptophlebia	0(0)	0	102(0)	13	0(0)	0	473(19)	46
T. Ephemeroptera	0(0)	0	102(0)	13	0(0)	0	473(19)	46
Chironomidae	0(0)	0	663(85)	87	31(31)	100	549(284)	54
Total benthos	0(0)	-	765(85)	-	31(31)	-	1023(303)	-
Total zooplankton	204(29)	-	186(27)	-	226(1)	-	306(35)	-

Appendix 74. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	34(34)	40	85(85)	7	0(0)	0	92(92)	4
Gammarus	0(0)	0	0(0)	0	0(0)	0	46(46)	2
Hyalella azteca	0(0)	0	318(106)	26	0(0)	0	275(0)	11
T. Amphipoda	0(0)	0	318(106)	26	0(0)	0	321(46)	13
Hydracarina	0(0)	0	64(21)	5	0(0)	0	275(92)	11
Caenis	0(0)	0	487(106)	40	0(0)	0	872(413)	34
Unid. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	46(46)	2
T. Ephemeroptera	0(0)	0	487(106)	40	0(0)	0	917(459)	36
Triaenodes	0(0)	0	42(42)	3	53(53)	100	0(0)	0
Oecetis	0(0)	0	42(42)	3	0(0)	0	275(92)	11
T. Trichoptera	0(0)	0	85(0)	7	53(53)	100	275(92)	11
Ceratopogonidae	0(0)	0	0(0)	0	0(0)	0	92(0)	4
Chironomidae	34(34)	40	191(64)	16	0(0)	0	550(0)	22
Pisidium sp	17(17)	20	0(0)	0	0(0)	0	0(0)	0
Total benthos	85(17)	-	1229(42)	-	53(53)	-	2523(780)	-
R. smelt larvae	17(17)	25	0(0)	0	0(0)	0	46(46)	17
Damaged larvae	51(51)	75	106(21)	100	158(53)	100	229(46)	83
Total fish larvae	68(34)	-	106(21)	-	158(53)	-	275(92)	-
Total zooplankton	2(1)	-	2(<1)	-	19(10)	-	7(2)	-

Appendix 75. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	38(13)	33	0(0)	0	0(0)	0	0(0)	0
Gammarus	0(0)	0	0(0)	0	0(0)	0	18(18)	1
Caenis	0(0)	0	0(0)	0	0(0)	0	54(18)	2
Stenacron	0(0)	0	29(29)	1	0(0)	0	0(0)	0
Eurylophella	0(0)	0	58(58)	3	0(0)	0	72(36)	3
Hexagenia	0(0)	0	1445(58)	66	0(0)	0	2347(36)	81
T. Ephemeroptera	0(0)	0	1532(87)	70	0(0)	0	2473(18)	85
Corixidae	0(0)	0	29(29)	1	0(0)	0	0(0)	0
Neureclipsis	0(0)	0	29(29)	1	0(0)	0	18(18)	1
Polycentropus	0(0)	0	0(0)	0	0(0)	0	18(18)	1
Oecetis	0(0)	0	145(29)	7	0(0)	0	90(18)	3
T. Trichoptera	0(0)	0	173(58)	8	0(0)	0	126(18)	4
Chironomidae	76(50)	67	462(58)	21	23(23)	100	289(72)	10
Total benthos	113(63)	-	2197(231)	-	23(23)	-	2906(90)	-
R. smelt larvae	416(38)	85	376(29)	50	741(139)	89	1191(38)	80
Damaged larvae	76(0)	15	376(145)	50	93(46)	11	307(199)	20
Total fish larvae	491(38)	-	751(173)	-	833(93)	-	1498(307)	-
Total zooplankton	109(28)	-	21(1)	-	133(28)	-	34(3)	-

Appendix 76. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	47(0)	27	0(0)	0	0(0)	0	0(0)	0
Naididae	47(47)	27	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	12(12)	7	0(0)	0	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	0(0)	0	21(21)	20	21(21)	1
Hydracarina	0(0)	0	0(0)	0	21(21)	20	21(21)	1
Stenonema	0(0)	0	0(0)	0	0(0)	0	41(0)	2
Eurylophella	0(0)	0	0(0)	0	0(0)	0	41(0)	2
Hexagenia	0(0)	0	186(93)	47	0(0)	0	967(21)	41
T. Ephemeroptera	0(0)	0	186(93)	47	0(0)	0	1049(21)	44
Neureclipsis	0(0)	0	0(0)	0	0(0)	0	41(41)	2
Polycentropus	0(0)	0	0(0)	0	0(0)	0	41(0)	2
Oecetis	12(12)	7	23(23)	6	0(0)	0	123(0)	5
T. Trichoptera	12(12)	7	23(23)	6	0(0)	0	206(41)	9
Ceratopogonidae	0(0)	0	0(0)	0	21(21)	20	21(21)	1
Chironomidae	59(12)	33	186(47)	47	41(41)	40	1049(21)	44
Total benthos w/o *Hydra*	129(35)	73	395(70)	100	103(62)	100	2366(21)	100
Total benthos	176(35)	-	395(70)	-	103(62)	-	2366(21)	-
R. smelt larvae	23(0)	50	140(47)	67	41(0)	50	1523(782)	78
Burbot larvae	12(12)	25	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	12(12)	25	70(23)	33	41(41)	50	432(185)	22
Total fish larvae	47(23)	-	209(23)	-	82(41)	-	1955(597)	-
Total zooplankton	40(3)	-	3(2)	-	107(16)	-	16(4)	-

Appendix 77. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	0(0)	0	26(26)	50	0(0)	0
Mysis relicta	0(0)	0	34(34)	1	0(0)	0	37(0)	1
Gammarus	0(0)	0	34(34)	1	0(0)	0	37(0)	1
Hyalella azteca	0(0)	0	34(34)	1	0(0)	0	19(19)	1
Total Amphipoda	0(0)	0	68(68)	3	0(0)	0	56(19)	2
Hydracarina	0(0)	0	68(68)	3	0(0)	0	0(0)	0
Eurylophella	0(0)	0	34(34)	1	0(0)	0	0(0)	0
Ear. instar Heptageniidae	0(0)	0	0(0)	0	0(0)	0	19(19)	1
Caenis	0(0)	0	0(0)	0	0(0)	0	19(19)	1
Ephemera	0(0)	0	34(34)	1	0(0)	0	0(0)	0
Hexagenia	0(0)	0	646(102)	27	0(0)	0	1896(186)	71
T. Ephemeroptera	0(0)	0	714(170)	30	0(0)	0	1933(186)	73
Oecetis	0(0)	0	306(34)	13	0(0)	0	223(74)	8
T. Trichoptera	0(0)	0	306(34)	13	0(0)	0	223(74)	8
Chironomidae	45(0)	100	1225(247)	51	26(26)	50	409(186)	15
Total benthos w/o *Hydra*	45(0)	100	2415(34)	100	26(26)	50	2658(428)	100
Total benthos	45(0)	-	2415(34)	-	52(52)	-	2658(428)	-
R. smelt larvae	477(209)	80	1054(578)	78	644(284)	83	1115(372)	74
Burbot larvae	52(22)	9	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	67(0)	11	306(238)	22	129(26)	17	390(19)	26
Total fish larvae	596(239)	-	1361(340)	-	773(258)	-	1506(353)	-
Total zooplankton	152(16)	-	20(<1)	-	254(31)	-	153(37)	-

Appendix 78. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	119(15)	37	0(0)	0	-	-	-	-
Naididae	7(7)	2	0(0)	0	-	-	-	-
Hydracarina	7(7)	2	0(0)	0	-	-	-	-
Hexagenia	0(0)	0	32(32)	25	-	-	-	-
T. Ephemeroptera	0(0)	0	32(32)	25	-	-	-	-
Chironomidae	186(7)	58	95(95)	75	-	-	-	-
Total benthos w/o *Hydra*	201(7)	63	127(63)	100	-	-	-	-
Total benthos	320(7)	-	127(63)	-	-	-	-	-
R. smelt larvae	1744(358)	93	32(32)	100	-	-	-	-
Burbot larvae	37(7)	2	0(0)	0	-	-	-	-
Damaged larvae	82(52)	5	0(0)	0	-	-	-	-
Total fish larvae	1863(402)	-	32(32)	-	-	-	-	-
Total zooplankton	364(45)	-	2(1)	-	-	-	-	-

Appendix 79. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	53(53)	50	0(0)	0	0(0)	0	23(23)	1
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	46(46)	2
Hyalella azteca	26(26)	25	0(0)	0	0(0)	0	46(46)	2
Crangonyx	0(0)	0	0(0)	0	0(0)	0	23(23)	1
T. Amphipoda	26(26)	25	0(0)	0	0(0)	0	69(69)	3
Hydracarina	18(0)	17	0(0)	0	20(20)	33	69(69)	3
Eurylophella	0(0)	0	0(0)	0	0(0)	0	46(46)	2
Hexagenia	0(0)	0	61(0)	11	20(20)	33	741(232)	34
T. Ephemeroptera	0(0)	0	61(0)	11	20(20)	33	787(278)	36
Oecetis	9(9)	8	61(0)	11	0(0)	0	93(46)	4
T. Trichoptera	9(9)	8	61(0)	11	0(0)	0	93(46)	4
Chironomidae	0(0)	0	424(242)	78	20(20)	33	1088(162)	50
Total benthos w/o Hydra	53(35)	50	545(242)	100	61(20)	100	2153(579)	99
Total benthos	105(88)	-	545(242)	-	61(20)	-	2176(602)	-
R. smelt larvae	166(9)	63	121(121)	52	0(0)	0	2222(463)	84
Burbot larvae	9(9)	3	0(0)	0	0(0)	0	0(0)	0
Lake herring larvae	0(0)	0	0(0)	0	0(0)	0	46(46)	2
Damaged larvae	88(18)	33	91(91)	48	0(0)	0	394(23)	15
Total fish larvae	263(18)	-	212(30)	-	0(0)	0	2662(532)	-
Total zooplankton	66(2)	-	1(<1)	-	4(2)	-	61(33)	-

Appendix 80. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	53(53)	30	0(0)	0	-	-	-	-
Naididae	0(0)	0	56(0)	2	-	-	-	-
Hyalella azteca	0(0)	0	28(28)	1	-	-	-	-
T. Amphipoda	0(0)	0	28(28)	1	-	-	-	-
Eurylophella	0(0)	0	28(28)	1	-	-	-	-
Unid. Ephemeroptera	9(9)	5	169(0)	5	-	-	-	-
Hexagenia	0(0)	0	169(113)	5	-	-	-	-
T. Ephemeroptera	9(9)	5	367(141)	10	-	-	-	-
Oecetis	0(0)	0	113(57)	3	-	-	-	-
Unid. Trichoptera	9(9)	5	0(0)	0	-	-	-	-
T. Trichoptera	9(9)	5	113(57)	3	-	-	-	-
Chironomidae	105(18)	60	2966(311)	84	-	-	-	-
Total benthos w/o *Hydra*	123(0)	70	3531(537)	100	-	-	-	-
Total benthos	175(53)	-	3531(537)	-	-	-	-	-
R. smelt larvae	306(26)	76	847(170)	81	-	-	-	-
Burbot larvae	18(0)	4	0(0)	0	-	-	-	-
Damaged larvae	79(26)	20	198(28)	19	-	-	-	-
Total fish larvae	403(0)	-	1045(198)	-	-	-	-	-
Total zooplankton	275(37)	-	256(2)	-	-	-	-	-

Appendix 81. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	13(13)	33	43(14)	5	15(15)	100	28(28)	5
Mysis relicta	0(0)	0	14(14)	2	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	14(14)	2	0(0)	0	14(14)	3
T. Amphipoda	0(0)	0	14(14)	2	0(0)	0	14(14)	3
Ephemera	0(0)	0	0(0)	0	0(0)	0	14(14)	3
Hexagenia	0(0)	0	374(29)	43	0(0)	0	282(56)	51
T. Ephemeroptera	0(0)	0	374(29)	43	0(0)	0	296(42)	54
Oecetis	0(0)	0	43(14)	5	0(0)	0	14(14)	3
T. Trichoptera	0(0)	0	43(14)	5	0(0)	0	14(14)	3
Ceratopogonidae	0(0)	0	14(14)	2	0(0)	0	0(0)	0
Chironomidae	25(0)	67	359(72)	42	0(0)	0	197(56)	36
Total benthos w/o *Hydra*	25(0)	67	819(72)	95	0(0)	0	521(42)	95
Total benthos	38(13)	-	862(58)	-	15(15)	-	549(14)	-
R. smelt larvae	151(50)	80	201(144)	50	335(248)	82	197(56)	42
Damaged larvae	38(38)	20	201(29)	50	73(15)	18	268(70)	58
Total fish larvae	188(13)	-	402(115)	-	408(233)	-	465(14)	-
Total zooplankton	121(5)	-	38(7)	-	102(54)	-	212(28)	-

Appendix 82. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	25(25)	6	29(29)	2	-	-	-	-
Turbellaria	0(0)	0	15(15)	1	-	-	-	-
Naididae	13(13)	3	0(0)	0	-	-	-	-
Enchytraeidae	0(0)	0	15(15)	1	-	-	-	-
Mysis relicta	0(0)	0	15(15)	1	-	-	-	-
Hexagenia	0(0)	0	118(59)	9	-	-	-	-
Unid. Ephemeroptera	0(0)	0	74(15)	5	-	-	-	-
T. Ephemeroptera	0(0)	0	192(44)	14	-	-	-	-
Chaoborus	0(0)	0	15(15)	1	-	-	-	-
Ceratopogonidae	0(0)	0	29(0)	2	-	-	-	-
Chironomidae	377(0)	91	1032(118)	77	-	-	-	-
Total benthos w/o *Hydra*	389(13)	94	1313(74)	98	-	-	-	-
Total benthos	415(13)	-	1342(44)	-	-	-	-	-
R. smelt larvae	113(13)	35	1534(0)	90	-	-	-	-
Damaged larvae	214(63)	65	162(15)	10	-	-	-	-
Total fish larvae	327(75)	-	1696(15)	-	-	-	-	-
Total zooplankton	253(60)	-	179(2)	-	-	-	-	-

Appendix 83. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

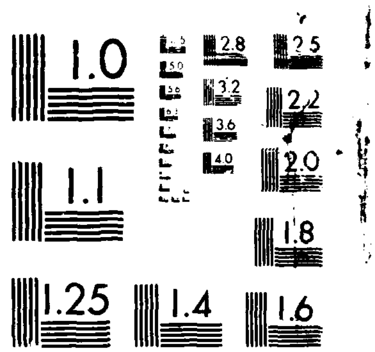
	Lake Nicolet Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	252(12)	84	43(43)	4	0(0)	0	64(13)	6
Naididae	12(12)	4	0(0)	0	0(0)	0	0(0)	0
Polychaeta	12(12)	4	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	13(13)	1
Hyalella azteca	0(0)	0	14(14)	1	0(0)	0	26(0)	2
Crangonyx	0(0)	0	0(0)	0	0(0)	0	13(13)	1
T. Amphipoda	0(0)	0	14(14)	1	0(0)	0	38(13)	4
Hydracarina	12(12)	4	14(14)	1	0(0)	0	0(0)	0
Eurylophella	0(0)	0	14(14)	1	0(0)	0	26(26)	2
Caenis	0(0)	0	29(29)	3	0(0)	0	0(0)	0
Ephemera	0(0)	0	0(0)	0	0(0)	0	38(13)	4
Hexagenia	0(0)	0	230(29)	20	0(0)	0	282(77)	27
T. Ephemeroptera	0(0)	0	273(72)	24	0(0)	0	346(39)	33
Neureclipsis	0(0)	0	0(0)	0	0(0)	0	13(13)	1
Triaenodes	0(0)	0	0(0)	0	0(0)	0	13(13)	1
Oecetis	0(0)	0	101(72)	9	0(0)	0	115(39)	11
T. Trichoptera	0(0)	0	101(72)	9	0(0)	0	141(64)	13
Ceratopogonidae	0(0)	0	0(0)	0	0(0)	0	13(13)	1
Chironomidae	12(12)	4	704(101)	61	0(0)	0	436(51)	42
Total benthos w/o *Hydra*	48(48)	16	1106(61)	96	0(0)	-	987(13)	94
Total benthos	300(60)	-	1149(0)	-	0(0)	-	1051(26)	-

Appendix 83. Continued.

	Lake Nicolet Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
R. smelt larvae	564(36)	81	977(0)	91	14(14)	25	244(115)	49
Burbot larvae	12(12)	2	43(14)	4	0(0)	0	0(0)	0
Damaged larvae	120(72)	17	57(57)	5	42(42)	75	256(26)	51
Total fish larvae	695(120)	-	1078(72)	-	55(28)	-	500(90)	-
Total zooplankton	208(17)	-	30(1)	-	105(5)	-	115(11)	-

AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86 4/7

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL



MICROCOPY RESOLUTION TEST CHA
NATIONAL BUREAU OF STANDARDS 1963

Appendix 84. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	275(108)	30	29(29)	2	-	-	-	-
Naididae	36(12)	4	0(0)	0	-	-	-	-
Mysis relicta	0(0)	0	29(29)	2	-	-	-	-
Pontoporeia hoyi	0(0)	0	15(15)	1	-	-	-	-
T. Amphipoda	0(0)	0	15(15)	1	-	-	-	-
Hydracarina	12(12)	1	15(15)	1	-	-	-	-
Eurylophella	0(0)	0	15(15)	1	-	-	-	-
Hexagenia	0(0)	0	147(118)	9	-	-	-	-
Unid. Ephemeroptera	0(0)	0	118(118)	7	-	-	-	-
T. Ephemeroptera	0(0)	0	280(251)	17	-	-	-	-
Oecetis	0(0)	0	59(0)	4	-	-	-	-
T. Trichoptera	0(0)	0	59(0)	4	-	-	-	-
Chironomidae	600(96)	65	1239(30)	74	-	-	-	-
Total benthos w/o *Hydra*	647(120)	70	1637(280)	98	-	-	-	-
Total benthos	923(228)	-	1667(310)	-	-	-	-	-
R. smelt larvae	1631(336)	90	1903(133)	94	-	-	-	-
Burbot larvae	24(24)	1	0(0)	0	-	-	-	-
Damaged larvae	156(84)	9	133(44)	6	-	-	-	-
Total fish larvae	1811(396)	-	2035(177)	-	-	-	-	-
Total zooplankton	738(46)	-	279(59)	-	-	-	-	-

Appendix 85. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	18(18)	13	61(61)	4	20(20)	25	28(0)	3
Naididae	0(0)	0	20(20)	1	0(0)	0	0(0)	0
Enchytraeidae	18(18)	13	0(0)	0	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	14(14)	1
Gammarus	0(0)	0	0(0)	0	0(0)	0	14(14)	1
Hyalella azteca	18(18)	13	61(20)	4	0(0)	0	14(14)	1
T. Amphipoda	18(18)	13	61(20)	4	0(0)	0	28(0)	3
Stenonema	0(0)	0	20(20)	1	0(0)	0	0(0)	0
Caenis	0(0)	0	0(0)	0	0(0)	0	28(0)	3
Hexagenia	0(0)	0	40(40)	2	0(0)	0	99(14)	9
T. Ephemeroptera	0(0)	0	61(20)	4	0(0)	0	127(14)	12
Neureclipsis	0(0)	0	61(20)	4	0(0)	0	14(14)	1
Polycentropus	0(0)	0	20(20)	1	0(0)	0	0(0)	0
Hydropsyche	0(0)	0	0(0)	0	20(20)	25	0(0)	0
Oxythira	0(0)	0	20(20)	1	0(0)	0	0(0)	0
Oecetis	0(0)	0	344(142)	20	0(0)	0	183(99)	18
T. Trichoptera	0(0)	0	445(162)	26	20(20)	25	197(113)	19
Lepidoptera	0(0)	0	20(20)	1	0(0)	0	0(0)	0
Chironomidae	89(54)	63	1053(162)	61	39(39)	50	648(197)	62
Total benthos w/o *Hydra*	125(89)	88	1660(324)	97	59(20)	75	1014(85)	97
Total benthos	143(107)	-	1721(385)	-	79(0)	-	1042(85)	-
R. smelt larvae	214(36)	80	951(304)	71	39(0)	40	704(563)	73
Damaged larvae	54(54)	20	348(61)	29	59(20)	60	254(28)	27
Total fish larvae	268(89)	-	1336(243)	-	98(20)	-	958(592)	-
Total zooplankton	104(26)	-	44(6)	-	103(25)	-	97(2)	-

Appendix 86. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	89(89)	6	62(62)	2	-	-	-	-
Turbellaria	0(0)	0	21(21)	<1	-	-	-	-
Naididae	18(18)	1	21(21)	<1	-	-	-	-
Enchytraeidae	18(18)	1	21(21)	<1	-	-	-	-
<u>Mysis relicta</u>	0(0)	0	41(41)	1	-	-	-	-
<u>Hyalella azteca</u>	0(0)	0	62(21)	2	-	-	-	-
T. Amphipoda	0(0)	0	62(21)	2	-	-	-	-
<u>Stenacron</u>	0(0)	0	41(41)	1	-	-	-	-
<u>Hexagenia</u>	0(0)	0	104(21)	3	-	-	-	-
Unid. Ephemeroptera	36(36)	2	560(21)	15	-	-	-	-
T. Ephemeroptera	36(36)	2	705(0)	19	-	-	-	-
<u>Oecetis</u>	0(0)	0	104(21)	3	-	-	-	-
Unid. Trichoptera	18(18)	1	0(0)	0	-	-	-	-
T. Trichoptera	18(18)	1	104(21)	3	-	-	-	-
Ceratopogonidae	0(0)	0	41(41)	1	-	-	-	-
Chironomidae	1304(196)	88	2739(166)	72	-	-	-	-
Total benthos w/o <u>Hydra</u>	1393(250)	94	3755(187)	98	-	-	-	-
Total benthos	1482(339)	-	3817(125)	-	-	-	-	-
R. smelt larvae	1232(125)	92	4066(83)	88	-	-	-	-
Burbot larvae	54(18)	4	0(0)	0	-	-	-	-
Damaged larvae	54(54)	4	561(21)	12	-	-	-	-
Total fish larvae	1339(89)	-	4627(62)	-	-	-	-	-
Total zooplankton	793(18)	-	292(59)	-	-	-	-	-

Appendix 87. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	16(16)	33	0(0)	0	0(0)	0	0(0)	0
Hydracarina	0(0)	0	30(0)	7	0(0)	0	25(25)	5
Alloperla	0(0)	0	15(15)	4	0(0)	0	13(13)	3
Baetis	0(0)	0	0(0)	0	0(0)	0	13(13)	3
Caenis	0(0)	0	30(30)	7	0(0)	0	13(13)	3
Hexagenia	0(0)	0	30(30)	7	0(0)	0	25(0)	5
T. Ephemeroptera	0(0)	0	59(0)	15	0(0)	0	50(25)	11
Corixidae	0(0)	0	0(0)	0	0(0)	0	25(25)	5
Oecetis	0(0)	0	59(0)	15	0(0)	0	38(13)	8
T. Trichoptera	0(0)	0	59(0)	15	0(0)	0	38(13)	8
Chironomidae	32(0)	67	237(0)	59	0(0)	0	313(38)	68
Total benthos	48(16)	-	401(15)	-	0(0)	-	463(38)	-
R. smelt larvae	591(48)	73	2048(1098)	91	804(315)	70	15637(2163)	100
Burbot larvae	16(16)	2	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	208(80)	25	208(148)	9	350(140)	30	0(0)	0
Total fish larvae	815(16)	-	2255(950)	-	1154(175)	-	15637(2163)	-
Total zooplankton	265(4)	-	127(4)	-	377(45)	-	648(205)	-

Appendix 88. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hyalella azteca	0(0)	0	0(0)	0	0(0)	0	11(11)	2
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	11(11)	2
Hydracarina	23(23)	17	0(0)	0	23(23)	25	22(0)	3
Caenis	0(0)	0	0(0)	0	0(0)	0	22(0)	3
Hexagenia	0(0)	0	0(0)	0	0(0)	0	11(11)	2
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	33(11)	5
Corixidae	0(0)	0	0(0)	0	45(45)	50	0(0)	0
Neureclipsis	0(0)	0	0(0)	0	0(0)	0	11(11)	2
Oecetis	0(0)	0	0(0)	0	0(0)	0	134(22)	19
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	145(33)	20
Chironomidae	116(70)	83	267(59)	100	23(23)	25	501(33)	70
Total benthos	140(93)	-	267(59)	-	90(45)	-	713(89)	-
R. smelt larvae	140(0)	100	252(252)	61	45(45)	67	6125(1002)	84
Damaged larvae	0(0)	0	163(45)	39	23(23)	33	1158(468)	16
Total fish larvae	140(0)	-	415(297)	-	68(23)	-	7283(535)	-
Total zooplankton	389(24)	-	27(12)	-	131(27)	-	208(8)	-

Appendix 89. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 6 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	0(0)	0	14(14)	20	13(13)	33	0(0)	0
Naididae	0(0)	0	14(14)	20	0(0)	0	19(19)	14
<u>Mysis relicta</u>	0(0)	0	14(14)	20	0(0)	0	19(19)	14
Hydracarina	0(0)	0	0(0)	0	0(0)	0	19(19)	14
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	37(0)	29
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	37(0)	29
<u>Oecetis</u>	0(0)	0	14(14)	20	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	14(14)	20	0(0)	0	0(0)	0
Chironomidae	56(19)	100	14(14)	20	26(0)	67	37(37)	29
Total benthos w/o <u>Hydra</u>	56(19)	100	56(56)	80	26(0)	67	131(19)	100
Total benthos	56(19)	-	70(42)	-	38(13)	-	131(19)	-
R. smelt larvae	504(392)	93	28(28)	12	2462(615)	87	149(112)	61
Damaged larvae	37(37)	7	211(70)	88	385(77)	13	93(19)	39
Total fish larvae	541(355)	-	239(99)	-	2846(692)	-	243(131)	-
Total zooplankton	53(7)	-	116(9)	-	229(40)	-	56(13)	-

Appendix 90. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 6 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Ephemera</u>	0(0)	0	14(14)	3	-	-	-	-
<u>Hexagenia</u>	0(0)	0	14(14)	3	-	-	-	-
Unid. Ephemeroptera	0(0)	0	14(14)	3	-	-	-	-
T. Ephemeroptera	0(0)	0	42(14)	9	-	-	-	-
Ceratopogonidae	0(0)	0	56(56)	12	-	-	-	-
Chironomidae	40(0)	100	380(127)	79	-	-	-	-
Total benthos	40(0)	100	479(169)	-	-	-	-	-
R. smelt larvae	202(121)	35	282(28)	67	-	-	-	-
Damaged larvae	383(222)	65	141(28)	33	-	-	-	-
Total fish larvae	585(343)	-	423(0)	-	-	-	-	-
Total zooplankton	25(9)	-	553(31)	-	-	-	-	-

Appendix 91. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	43(43)	20	27(27)	6	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	40(13)	9	0(0)	0	42(14)	12
Ephemera	0(0)	0	13(13)	3	0(0)	0	0(0)	0
Hexagenia	0(0)	0	27(27)	6	0(0)	0	42(14)	12
T. Ephemeroptera	0(0)	0	40(13)	9	0(0)	0	42(14)	12
Triaenodes	0(0)	0	13(13)	3	0(0)	0	0(0)	0
Oecetis	0(0)	0	27(0)	6	0(0)	0	0(0)	0
Unid. Trichoptera	21(21)	10	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	21(21)	10	40(13)	9	0(0)	0	0(0)	0
Simuliidae	21(21)	10	0(0)	0	0(0)	0	0(0)	0
Chironomidae	129(43)	60	322(134)	69	42(14)	100	282(56)	77
Total benthos w/o *Hydra*	172(86)	80	442(174)	94	42(14)	100	366(85)	100
Total benthos	215(43)	-	469(148)	-	42(14)	-	366(85)	-
R. smelt larvae	86(86)	67	67(67)	63	310(310)	79	70(70)	23
Damaged larvae	43(43)	33	40(40)	37	85(85)	21	239(42)	77
Total fish larvae	129(129)	-	107(27)	-	394(225)	-	310(113)	-
Total zooplankton	129(56)	-	25(3)	-	65(2)	-	32(2)	-

Appendix 92. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 6 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	93(93)	33	13(13)	1	-	-	-	-
Naididae	23(23)	8	54(0)	4	-	-	-	-
Mysis relicta	0(0)	0	13(13)	1	-	-	-	-
Hyalella azteca	0(0)	0	13(13)	1	-	-	-	-
T. Amphipoda	0(0)	0	13(13)	1	-	-	-	-
Ephemera	0(0)	0	13(13)	1	-	-	-	-
Hexagenia	0(0)	0	27(27)	2	-	-	-	-
Unid. Ephemeroptera	0(0)	0	13(13)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	54(27)	4	-	-	-	-
Triaenodes	0(0)	0	13(13)	1	-	-	-	-
T. Trichoptera	0(0)	0	13(13)	1	-	-	-	-
Lepidoptera	0(0)	0	13(13)	1	-	-	-	-
Ceratopogonidae	0(0)	0	54(0)	4	-	-	-	-
Chironomidae	163(70)	58	1220(94)	84	-	-	-	-
Total benthos w/o *Hydra*	186(47)	67	1434(148)	99	-	-	-	-
Total benthos	279(47)	-	1448(134)	-	-	-	-	-
R. smelt larvae	233(140)	77	442(201)	62	-	-	-	-
Damaged larvae	70(23)	23	268(107)	38	-	-	-	-
Total fish larvae	302(116)	-	710(94)	-	-	-	-	-
Total zooplankton	416(113)	-	180(52)	-	-	-	-	-

Appendix 93. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	43(43)	20	194(83)	12	0(0)	0	0(0)	0
Naididae	21(21)	10	28(28)	2	0(0)	0	0(0)	0
Mysis relicta	0(0)	0	111(56)	7	0(0)	0	18(18)	4
Hyalella azteca	0(0)	0	167(111)	10	0(0)	0	53(18)	13
Crangonyx	0(0)	0	28(28)	2	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	194(83)	12	0(0)	0	53(18)	13
Hydracarina	0(0)	0	0(0)	0	0(0)	0	18(18)	4
Stenacron	0(0)	0	0(0)	0	0(0)	0	18(18)	4
Caenis	0(0)	0	28(28)	2	0(0)	0	0(0)	0
Ephemera	0(0)	0	28(28)	2	0(0)	0	0(0)	0
Hexagenia	0(0)	0	111(0)	7	0(0)	0	35(0)	8
T. Ephemeroptera	0(0)	0	167(56)	10	0(0)	0	53(18)	13
Neureclipsis	0(0)	0	0(0)	0	0(0)	0	18(18)	4
Oecetis	0(0)	0	56(56)	3	0(0)	0	18(18)	4
T. Trichoptera	0(0)	0	56(56)	3	0(0)	0	35(0)	8
Chironomidae	150(150)	70	917(250)	55	70(0)	100	246(35)	58
Total benthos w/o _Hydra_	172(172)	80	1472(417)	88	70(0)	100	421(70)	100
Total benthos	215(215)	-	1667(500)	-	70(0)	-	421(70)	-
R. smelt larvae	172(43)	100	556(56)	74	298(158)	77	316(211)	62
Damaged larvae	0(0)	0	194(194)	26	88(53)	23	193(53)	38
Total fish larvae	172(43)	-	750(139)	-	386(105)	-	509(158)	-
Total zooplankton	79(6)	-	50(1)	-	102(34)	-	34(3)	-

Appendix 94. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for *benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³)* components in drift samples collected from the St. Marys River, 1985.

Taxon	Lake Nicolet Summer - Station 6 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Hydra</u>	0(0)	0	472(194)	10	-	-	-	-
Naididae	70(70)	21	28(28)	1	-	-	-	-
<u>Hyalella azteca</u>	0(0)	0	28(28)	1	-	-	-	-
T. Amphipoda	0(0)	0	28(28)	1	-	-	-	-
Baetidae	0(0)	0	56(56)	1	-	-	-	-
<u>Ephemera</u>	0(0)	0	28(28)	1	-	-	-	-
<u>Hexagenia</u>	0(0)	0	167(111)	4	-	-	-	-
Unid. Ephemeroptera	0(0)	0	56(56)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	306(83)	6	-	-	-	-
<u>Polycentropus</u>	0(0)	0	28(28)	1	-	-	-	-
<u>Oecetis</u>	0(0)	0	111(56)	2	-	-	-	-
T. Trichoptera	0(0)	0	139(28)	3	-	-	-	-
Lepidoptera	0(0)	0	56(0)	1	-	-	-	-
Ceratopogonidae	0(0)	0	139(139)	3	-	-	-	-
Chironomidae	256(209)	79	3611(389)	76	-	-	-	-
Total benthos w/o <u>Hydra</u>	325(140)	100	4306(139)	90	-	-	-	-
Total benthos	325(140)	-	4778(333)	-	-	-	-	-
R. smelt larvae	349(23)	68	1861(250)	87	-	-	-	-
Damaged larvae	163(23)	32	278(278)	13	-	-	-	-
Total fish larvae	512(47)	-	2139(28)	-	-	-	-	-
Total zooplankton	241(29)	-	477(87)	-	-	-	-	-

Appendix 95. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 7 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	22(22)	2	0(0)	0	0(0)	0
Collembola	0(0)	0	0(0)	0	0(0)	0	30(30)	8
Stenonema	0(0)	0	44(44)	3	0(0)	0	0(0)	0
Caenis	0(0)	0	22(22)	2	0(0)	0	0(0)	0
Hexagenia	0(0)	0	686(111)	49	0(0)	0	122(0)	33
T. Ephemeroptera	0(0)	0	752(133)	54	0(0)	0	122(0)	33
Triaenodes	0(0)	0	22(22)	2	0(0)	0	0(0)	0
Oecetis	0(0)	0	111(66)	8	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	133(44)	10	0(0)	0	0(0)	0
Chironomidae	0(0)	0	487(44)	35	125(0)	100	213(152)	58
Total benthos	0(0)	0	1394(155)	-	125(0)	-	366(183)	-
R. smelt larvae	374(165)	73	398(310)	39	3906(31)	95	488(61)	59
Damaged larvae	142(52)	27	619(0)	61	219(219)	5	335(91)	41
Total fish larvae	516(217)	-	1018(310)	-	4125(250)	-	823(152)	-
Total zooplankton	55(4)	-	66(19)	-	285(23)	-	173(41)	-

Appendix 96. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 7 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	8(8)	14	0(0)	0	-	-	-	-
<u>Stenonema</u>	0(0)	0	22(22)	1	-	-	-	-
<u>Hexagenia</u>	0(0)	0	177(0)	6	-	-	-	-
Unid. Ephemeroptera	0(0)	0	88(44)	3	-	-	-	-
T. Ephemeroptera	0(0)	0	288(66)	10	-	-	-	-
<u>Oecetis</u>	0(0)	0	88(0)	3	-	-	-	-
T. Trichoptera	0(0)	0	88(0)	3	-	-	-	-
Ceratopogonidae	0(0)	0	22(22)	1	-	-	-	-
Chironomidae	46(15)	86	2456(332)	86	-	-	-	-
Total benthos	53(23)	-	2854(243)	-	-	-	-	-
R. smelt larvae	312(99)	76	531(266)	47	-	-	-	-
Damaged larvae	99(68)	24	597(22)	53	-	-	-	-
Total fish larvae	411(30)	-	1128(288)	-	-	-	-	-
Total zooplankton	169(16)	-	86(52)	-	-	-	-	-

Appendix 97. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	0(0)	0	68(68)	100	0(0)	0
Stenonema	0(0)	0	155(52)	8	0(0)	0	44(44)	3
Ephemera	0(0)	0	26(26)	1	0(0)	0	0(0)	0
Hexagenia	0(0)	0	129(26)	7	0(0)	0	132(132)	8
T. Ephemeroptera	0(0)	0	309(103)	16	0(0)	0	175(175)	11
Oecetis	0(0)	0	361(0)	18	0(0)	0	263(175)	17
T. Trichoptera	0(0)	0	360(0)	18	0(0)	0	263(175)	17
Chironomidae	8(8)	100	1314(284)	66	0(0)	0	1140(175)	72
Total benthos w/o *Hydra*	8(8)	100	1985(180)	100	0(0)	0	1579(526)	100
Total benthos	8(8)	-	1985(180)	-	68(68)	-	1579(526)	-
R. smelt larvae	0(0)	0	26(26)	20	102(102)	75	395(44)	90
Damaged larvae	17(17)	100	103(52)	80	34(34)	25	44(44)	10
Total fish larvae	17(17)	100	129(26)	-	136(68)	-	439(0)	-
Total zooplankton	12(5)	-	14(1)	-	33(3)	-	45(10)	-

Appendix 98. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 7 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	8(8)	11	0(0)	0	-	-	-	-
Turbellaria	0(0)	0	26(26)	1	-	-	-	-
Naididae	8(8)	11	0(0)	0	-	-	-	-
Gammarus	0(0)	0	26(26)	1	-	-	-	-
Hyalella azteca	0(0)	0	26(26)	1	-	-	-	-
T. Amphipoda	0(0)	0	52(0)	2	-	-	-	-
Stenonema	0(0)	0	26(26)	1	-	-	-	-
Hexagenia	0(0)	0	26(26)	1	-	-	-	-
Unid. Ephemeroptera	0(0)	0	26(26)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	77(77)	2	-	-	-	-
Neureclipsis	0(0)	0	26(26)	1	-	-	-	-
Oecetis	0(0)	0	155(103)	4	-	-	-	-
T. Trichoptera	0(0)	0	180(129)	5	-	-	-	-
Chironomidae	59(25)	78	3196(412)	91	-	-	-	-
Total benthos w/o *Hydra*	67(34)	89	3531(180)	100	-	-	-	-
Total benthos	76(25)	-	3531(180)	-	-	-	-	-
R. smelt larvae	42(25)	83	309(309)	67	-	-	-	-
Damaged larvae	8(8)	17	155(52)	33	-	-	-	-
Total fish larvae	50(34)	-	464(258)	-	-	-	-	-
Total zooplankton	59(3)	-	36(21)	-	-	-	-	-

Appendix 99. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 8 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Turbellaria	0(0)	0	15(15)	2	0(0)	0	0(0)	0
Hydracarina	0(0)	0	0(0)	0	0(0)	0	24(24)	17
Collembola	0(0)	0	0(0)	0	0(0)	0	24(24)	17
Caenis	0(0)	0	448(119)	62	0(0)	0	24(24)	17
Hexagenia	0(0)	0	119(30)	17	0(0)	0	0(0)	0
Unid. Ephemeroptera	0(0)	0	15(15)	2	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	582(105)	81	0(0)	0	24(24)	17
Polycentropus	14(14)	33	0(0)	0	0(0)	0	0(0)	0
Oecetis	0(0)	0	15(15)	2	0(0)	0	0(0)	0
T. Trichoptera	14(14)	33	15(15)	2	0(0)	0	0(0)	0
Chironomidae	28(28)	67	104(15)	15	42(42)	100	73(24)	50
Total benthos	42(42)	-	716(119)	-	42(42)	-	146(0)	-
R. smelt larvae	142(142)	45	15(15)	33	105(21)	71	0(0)	0
Damaged larvae	170(28)	55	30(0)	67	42(0)	29	73(73)	100
Total fish larvae	312(170)	-	45(15)	-	147(21)	-	73(73)	-
Total zooplankton	25(<1)	-	5(1)	-	7(<1)	-	7(2)	-

Appendix 100. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 8 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydracarina	0(0)	0	0(0)	0	28(28)	100	81(81)	17
Hyalella azteca	0(0)	0	17(17)	3	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	17(17)	3	0(0)	0	0(0)	0
Eurylophella	0(0)	0	17(17)	3	0(0)	0	0(0)	0
Caenis	0(0)	0	373(34)	56	0(0)	0	122(41)	25
Hexagenia	0(0)	0	51(17)	8	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	441(68)	67	0(0)	0	122(41)	25
Neureclipsis	0(0)	0	17(17)	3	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	17(17)	3	0(0)	0	0(0)	0
Chironomidae	16(16)	100	186(17)	28	0(0)	0	285(122)	58
Total benthos	16(16)	100	661(17)	-	28(28)	-	488(0)	-
R. smelt larvae	16(16)	100	17(17)	33	56(56)	67	41(41)	50
Damaged larvae	0(0)	0	34(34)	67	28(28)	33	41(41)	50
Total fish larvae	16(16)	-	51(17)	-	83(83)	-	81(0)	-
Total zooplankton	6(1)	-	3(<1)	-	18(<1)	-	8(2)	-

Appendix 101. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Lake Nicolet Summer - Station 9 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	42(42)	13	0(0)	0	0(0)	0	0(0)	0
Naididae	42(42)	13	0(0)	0	0(0)	0	0(0)	0
Hydracarina	85(0)	25	44(44)	3	0(0)	0	0(0)	0
Baetidae	0(0)	0	22(22)	1	0(0)	0	0(0)	0
Ea. instar Heptageniidae	0(0)	0	22(22)	1	0(0)	0	0(0)	0
Caenis	42(42)	13	1223(44)	73	0(0)	0	25(25)	13
T. Ephemeroptera	42(42)	13	1266(87)	75	0(0)	0	25(25)	13
Oecetis	42(42)	13	66(22)	4	0(0)	0	0(0)	0
T. Trichoptera	42(42)	13	66(22)	4	0(0)	0	0(0)	0
Chironomidae	85(0)	25	306(87)	18	37(37)	100	175(125)	87
Total benthos w/o *Hydra*	297(42)	88	1681(22)	100	37(37)	100	200(150)	100
Total benthos	339(85)	-	1681(22)	-	37(37)	-	200(150)	-
R. smelt larvae	42(42)	50	0(0)	0	0(0)	0	0(0)	0
Damaged larvae	42(42)	50	0(0)	0	0(0)	0	0(0)	0
Total fish larvae	85(0)	-	0(0)	0	0(0)	0	0(0)	0
Total zooplankton	43(3)	-	4(<1)	-	4(1)	-	3(<1)	-

Appendix 102. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	0(0)	0	43(43)	100	0(0)	0	48(29)	100
Total benthos	0(0)	-	43(43)	-	0(0)	0	48(29)	-
Total zooplankton	171(161)	-	231(42)	-	182(24)	-	99(5)	-

Appendix 103. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	0(0)	0	55(18)	100	0(0)	0	32(5)	100
Total benthos	0(0)	-	55(18)	-	0(0)	0	32(5)	-
Total zooplankton	35(<1)	-	556(57)	-	79(31)	-	344(69)	-

Appendix 104. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hyalella azteca	0(0)	0	5(5)	7	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	5(5)	7	0(0)	0	0(0)	0
Corixidae	13(0)	100	9(9)	13	0(0)	0	5(5)	25
Oxythira	0(0)	0	9(9)	13	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	9(9)	13	0(0)	0	0(0)	0
Chironomidae	0(0)	0	46(27)	67	0(0)	0	14(5)	75
Total benthos	13(0)	-	69(50)	-	0(0)	-	18(9)	-
Total zooplankton	12(10)	-	117(61)	-	16(2)	-	79(21)	-

Appendix 105. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	0(0)	0	76(30)	100	0(0)	0	68(8)	100
Total benthos	0(0)	-	76(30)	-	0(0)	0	68(8)	-
Total zooplankton	208(29)	-	273(119)	-	473(17)	-	43(26)	-

Appendix 106. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Gammarus</u>	10(10)	100	0(0)	0	-	-	-	-
T. Amphipoda	10(10)	100	0(0)	0	-	-	-	-
Chironomidae	0(0)	0	367(22)	100	-	-	-	-
Total benthos	10(10)	-	367(22)	-	-	-	-	-
Total zooplankton	184(175)	-	224(207)	-	-	-	-	-

Appendix 107. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	9(0)	10	0(0)	0	0(0)	0
Gammarus	6(6)	50	0(0)	0	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	5(5)	5	0(0)	0	9(9)	33
T. Amphipoda	6(6)	50	5(5)	5	0(0)	0	9(9)	33
Hydracarina	0(0)	0	5(5)	5	0(0)	0	0(0)	0
Hexagenia	0(0)	0	9(0)	10	0(0)	0	0(0)	0
T. Ephemeroptera	0(0)	0	9(0)	10	0(0)	0	0(0)	0
Corixidae	6(6)	50	0(0)	0	0(0)	0	5(5)	17
Chironomidae	0(0)	0	65(9)	70	0(0)	0	14(5)	50
Total benthos	12(12)	-	94(9)	-	0(0)	-	28(0)	-
Total zooplankton	10(2)	-	82(12)	-	7(1)	-	31(20)	-

Appendix 108. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	5(5)	1	-	-	-	-
Hydracarina	0(0)	0	5(5)	1	-	-	-	-
Corixidae	0(0)	0	5(5)	1	-	-	-	-
Chironomidae	0(0)	0	505(70)	96	-	-	-	-
Muscidae	0(0)	0	5(5)	1	-	-	-	-
Total benthos	0(0)	0	524(70)	-	-	-	-	-
Total zooplankton	86(84)	-	89(87)	-	-	-	-	-

Appendix 109. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	5(5)	40
Gammarus	0(0)	0	0(0)	0	0(0)	0	3(3)	20
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	3(3)	20
Chironomidae	0(0)	0	8(3)	100	4(4)	100	5(5)	40
Total benthos	0(0)	-	8(3)	-	4(4)	-	14(3)	-
Total zooplankton	115(21)	-	345(26)	-	113(25)	-	247(7)	-

Appendix 110. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	0(0)	0	141(10)	100	-	-	-	-
Total benthos	0(0)	-	141(10)	-	-	-	-	-
Total zooplankton	53(24)	-	237(12)	-	-	-	-	-

Appendix 111. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	2(2)	20	0(0)	0	0(0)	0
Lirceus	3(3)	100	0(0)	0	0(0)	0	0(0)	0
Chironomidae	0(0)	0	8(4)	80	0(0)	0	9(4)	100
Total benthos	3(3)	-	10(2)	-	0(0)	0	9(4)	-
Total zooplankton	332(139)	-	226(3)	-	336(9)	-	142(19)	-

Appendix 112. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	16(3)	100	54(12)	100	-	-	-	-
Total benthos	16(3)	-	54(12)	-	-	-	-	-
Total zooplankton	536(13)	-	124(41)	-	-	-	-	-

Appendix 113. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Mysis relicta	0(0)	0	0(0)	0	0(0)	0	3(3)	14
Gammarus	0(0)	0	0(0)	0	0(0)	0	6(0)	29
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	6(0)	29
Hydracarina	0(0)	0	3(3)	8	0(0)	0	3(3)	14
Chironomidae	9(9)	100	37(25)	92	4(4)	100	10(3)	43
Total benthos	9(9)	-	40(28)	-	4(4)	-	23(3)	-
Total zooplankton	177(16)	-	335(141)	-	304(18)	-	272(47)	-

Appendix 114. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Chironomidae	108(5)	100	278(56)	100	-	-	-	-
Total benthos	108(5)	-	278(56)	-	-	-	-	-
Total zooplankton	136(25)	-	162(18)	-	-	-	-	-

Appendix 115. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	26(26)	17	0(0)	0	0(0)	0	0(0)	0
Naididae	13(13)	8	0(0)	0	0(0)	0	34(34)	1
Hyalella azteca	0(0)	0	68(68)	2	0(0)	0	205(137)	8
T. Amphipoda	0(0)	0	68(68)	2	0(0)	0	205(137)	8
Hydracarina	52(9)	33	993(103)	26	121(24)	50	890(0)	34
Caenis	13(13)	8	719(103)	19	0(0)	0	274(68)	10
Ephemera	0(0)	0	0(0)	0	0(0)	0	34(34)	1
Hexagenia	0(0)	0	68(68)	2	0(0)	0	34(34)	1
T. Ephemeroptera	13(13)	8	788(34)	21	0(0)	0	342(68)	13
Corixidae	0(0)	0	514(34)	13	73(24)	30	137(137)	5
Oecetis	0(0)	0	890(342)	23	0(0)	0	479(68)	18
Unid. Trichoptera	13(13)	8	0(0)	0	24(24)	10	0(0)	0
T. Trichoptera	13(13)	8	890(342)	23	24(24)	10	479(68)	18
Chironomidae	39(13)	25	582(171)	15	24(24)	10	548(274)	21
Total benthos w/o *Hydra*	131(26)	83	3836(274)	100	243(0)	100	2637(514)	100
Total benthos	157(52)	-	3836(274)	-	243(0)	-	2637(514)	-
Total zooplankton	2(0)	-	227(19)	-	2(1)	-	182(62)	-

Appendix 116. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
<u>Gammarus</u>	0(0)	0	0(0)	0	0(0)	0	22(22)	1
<u>Hyalella azteca</u>	0(0)	0	220(88)	20	0(0)	0	43(0)	3
T. Amphipoda	0(0)	0	220(88)	20	0(0)	0	65(22)	4
Hydracarina	0(0)	0	529(44)	47	30(30)	100	1152(457)	71
<u>Caenis</u>	0(0)	0	66(66)	6	0(0)	0	65(22)	4
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	43(0)	3
T. Ephemeroptera	0(0)	0	66(66)	6	0(0)	0	109(22)	7
<u>Oecetis</u>	0(0)	0	88(0)	8	0(0)	0	43(0)	3
T. Trichoptera	0(0)	0	88(0)	8	0(0)	0	43(0)	3
Chironomidae	15(15)	100	220(44)	20	0(0)	0	261(43)	16
Total benthos	15(15)	-	1123(66)	-	30(30)	-	1630(457)	-
Total zooplankton	<1(0)	-	75(12)	-	5(4)	-	147(3)	-

Appendix 117. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m³), ichthyoplankton (no./1000 m³), and zooplankton (no./m³) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	0(0)	0	0(0)	0	24(24)	67	0(0)	0
Hyalella azteca	0(0)	0	97(0)	15	0(0)	0	48(48)	5
T. Amphipoda	0(0)	0	97(0)	15	0(0)	0	48(48)	5
Hydracarina	147(29)	77	314(24)	48	0(0)	0	595(24)	61
Caenis	0(0)	0	48(48)	7	0(0)	0	214(119)	22
T. Ephemeroptera	0(0)	0	48(48)	7	0(0)	0	214(119)	22
Corixidae	15(15)	8	0(0)	0	0(0)	0	0(0)	0
Oecetis	0(0)	0	72(24)	11	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	72(24)	11	0(0)	0	0(0)	0
Chironomidae	29(29)	15	121(24)	19	12(12)	33	119(71)	12
Total benthos	192(15)	-	652(24)	1	36(12)	-	976(119)	-
Total zooplankton	15(7)	-	107(5)	-	7(<1)	-	107(8)	-

Appendix 118. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hyalella azteca	0(0)	0	25(25)	7	0(0)	0	93(46)	24
T. Amphipoda	0(0)	0	25(25)	7	0(0)	0	93(46)	24
Hydracarina	12(12)	25	151(0)	43	0(0)	0	46(0)	12
Eurylophella	0(0)	0	25(25)	7	0(0)	0	0(0)	0
Caenis	0(0)	0	25(25)	7	0(0)	0	23(23)	6
Hexagenia	0(0)	0	0(0)	0	0(0)	0	23(23)	6
T. Ephemeroptera	0(0)	0	50(0)	14	0(0)	0	46(46)	12
Oecetis	0(0)	0	75(25)	21	0(0)	0	46(46)	12
T. Trichoptera	0(0)	0	75(25)	21	0(0)	0	46(46)	12
Chironomidae	36(12)	75	50(50)	14	0(0)	0	162(116)	41
Total benthos	48(24)	-	352(0)	-	0(0)	0	394(162)	-
Total zooplankton	5(2)	-	7(1)	-	<1(<1)	-	14(<1)	-

Appendix 119. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	0(0)	0	25(25)	1	-	-	-	-
Hyalella azteca	0(0)	0	75(75)	3	-	-	-	-
T. Amphipoda	0(0)	0	75(75)	3	-	-	-	-
Hydracarina	25(0)	9	547(50)	22	-	-	-	-
Ear. instar Plecoptera	0(0)	0	25(25)	1	-	-	-	-
Ear. instar Baetidae	0(0)	0	25(25)	1	-	-	-	-
Caenis	0(0)	0	75(25)	3	-	-	-	-
Hexagenia	0(0)	0	25(25)	1	-	-	-	-
T. Ephemeroptera	0(0)	0	124(25)	5	-	-	-	-
Corixidae	13(13)	4	0(0)	0	-	-	-	-
Oecetis	0(0)	0	124(75)	5	-	-	-	-
T. Trichoptera	0(0)	0	124(75)	5	-	-	-	-
Ceratopogonidae	0(0)	0	100(50)	4	-	-	-	-
Chironomidae	251(0)	87	1517(373)	60	-	-	-	-
Total benthos	288(13)	-	2537(697)	-	-	-	-	-
R. smelt eggs	0(0)	0	50(50)	100	-	-	-	-
Total fish eggs	0(0)	-	50(50)	-	-	-	-	-
Total zooplankton	184(24)	-	1148(100)	-	-	-	-	-

Appendix 120. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	0(0)	0	0(0)	0	0(0)	0	68(34)	7
<u>Hyalella azteca</u>	0(0)	0	148(37)	14	0(0)	0	34(0)	4
T. Amphipoda	0(0)	0	148(37)	14	0(0)	0	34(0)	4
Hydracarina	102(51)	80	387(129)	38	36(12)	100	390(85)	41
<u>Caenis</u>	0(0)	0	111(74)	11	0(0)	0	186(119)	20
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	17(17)	2
T. Ephemeroptera	0(0)	0	111(74)	11	0(0)	0	203(136)	21
Corixidae	0(0)	0	18(18)	2	0(0)	0	0(0)	0
<u>Oecetis</u>	0(0)	0	111(0)	11	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	111(0)	11	0(0)	0	0(0)	0
Ceratopogonidae	0(0)	0	18(18)	2	0(0)	0	0(0)	0
Chironomidae	26(0)	20	240(55)	23	0(0)	0	254(85)	27
Total benthos	128(51)	-	1033(295)	-	36(12)	-	949(339)	-
Damaged larvae	0(0)	0	18(18)	100	0(0)	0	0(0)	0
Total fish larvae	0(0)	-	18(18)	-	0(0)	-	0(0)	-
Total zooplankton	3(1)	-	68(22)	-	1(1)	-	24(1)	-

Appendix 121. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	0(0)	0	18(18)	1	-	-	-	-
<u>Hyalella azteca</u>	0(0)	0	164(18)	9	-	-	-	-
T. Amphipoda	0(0)	0	164(18)	9	-	-	-	-
Hydracarina	13(13)	33	438(0)	24	-	-	-	-
<u>Caenis</u>	0(0)	0	73(36)	4	-	-	-	-
T. Ephemeroptera	0(0)	0	73(36)	4	-	-	-	-
<u>Oecetis</u>	0(0)	0	36(0)	2	-	-	-	-
T. Trichoptera	0(0)	0	36(0)	2	-	-	-	-
Chironomidae	27(27)	67	1131(73)	61	-	-	-	-
Total benthos	40(40)	-	1861(36)	-	-	-	-	-
R. smelt larvae	0(0)	0	18(18)	100	-	-	-	-
Total fish larvae	0(0)	-	18(18)	-	-	-	-	-
Total zooplankton	10(5)	-	885(26)	-	-	-	-	-

Appendix 122. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydracarina	13(13)	100	0(0)	0	0(0)	0	83(17)	42
<u>Hexagenia</u>	0(0)	0	0(0)	0	0(0)	0	17(17)	8
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	17(17)	8
<u>Oecetis</u>	0(0)	0	0(0)	0	0(0)	0	33(0)	17
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	33(0)	17
Chironomidae	0(0)	0	0(0)	0	0(0)	0	66(66)	33
Total benthos	13(13)	-	0(0)	0	0(0)	0	198(66)	-
R. smelt larvae	38(13)	43	31(31)	100	29(0)	100	17(17)	100
Damaged larvae	50(0)	57	0(0)	0	0(0)	0	0(0)	0
Total fish larvae	88(13)	-	31(31)	-	29(0)	-	17(17)	-
Total zooplankton	4(<1)	-	3(<1)	-	5(1)	-	12(3)	-

Appendix 123. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydracarina	13(13)	4	14(14)	5	-	-	-	-
Chironomidae	305(93)	96	300(71)	95	-	-	-	-
Total benthos	318(106)	-	314(57)	-	-	-	-	-
R. smelt larvae	80(53)	100	14(14)	100	-	-	-	-
Total fish larvae	80(53)	-	14(14)	-	-	-	-	-
Total zooplankton	811(48)	-	399(27)	-	-	-	-	-

Appendix 124. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	0(0)	0	14(14)	100	0(0)	0
Hyalella azteca	0(0)	0	0(0)	0	0(0)	0	54(54)	33
T. Amphipoda	0(0)	0	0(0)	0	0(0)	0	54(54)	33
Hydracarina	0(0)	0	0(0)	0	0(0)	0	18(18)	11
Oecetis	0(0)	0	17(17)	25	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	17(17)	25	0(0)	0	0(0)	0
Chironomidae	23(0)	100	51(17)	75	0(0)	0	91(54)	56
Total benthos w/o *Hydra*	23(0)	100	68(34)	100	0(0)	0	163(127)	100
Total benthos	23(0)	-	68(34)	-	14(14)	-	163(127)	-
R. smelt larvae	12(12)	100	34(34)	100	41(14)	100	18(18)	100
Total fish larvae	12(12)	-	34(34)	-	41(14)	-	18(18)	-
Total zooplankton	3(1)	-	5(1)	-	9(1)	-	4(<1)	-

Appendix 125. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	12(12)	2	0(0)	0	-	-	-	-
Chironomidae	531(86)	98	645(173)	100	-	-	-	-
Total benthos	543(99)	-	645(173)	-	-	-	-	-
R. smelt larvae	123(49)	100	94(31)	86	-	-	-	-
Damaged larvae	0(0)	0	16(16)	14	-	-	-	-
Total fish larvae	123(49)	-	110(16)	-	-	-	-	-
Total zooplankton	902(23)	-	320(51)	-	-	-	-	-

Appendix 126. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hyalella azteca	0(0)	0	57(19)	38	0(0)	0	181(20)	53
T. Amphipoda	0(0)	0	57(19)	38	0(0)	0	181(20)	53
Hydracarina	29(0)	67	38(38)	25	50(50)	100	0(0)	0
Hexagenia	0(0)	0	0(0)	0	0(0)	0	40(0)	12
T. Ephemeroptera	0(0)	0	0(0)	0	0(0)	0	40(0)	12
Corixidae	0(0)	0	19(19)	12	0(0)	0	0(0)	0
Triaenodes	0(0)	0	0(0)	0	0(0)	0	20(20)	6
Oecetis	0(0)	0	0(0)	0	0(0)	0	20(20)	6
T. Trichoptera	0(0)	0	0(0)	0	0(0)	0	40(0)	12
Chironomidae	14(14)	33	38(38)	25	0(0)	0	80(40)	24
Total benthos	43(14)	-	152(38)	-	50(50)	-	341(20)	-
R. smelt larvae	0(0)	0	0(0)	0	0(0)	0	100(20)	100
Damaged larvae	14(14)	100	57(19)	100	0(0)	0	0(0)	0
Total fish larvae	14(14)	-	57(19)	-	0(0)	-	100(20)	-
Total zooplankton	5(1)	-	14(2)	-	7(<1)	-	11(4)	-

Appendix 127. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	30(0)	4	0(0)	0	-	-	-	-
Mysis relicta	0(0)	0	17(17)	2	-	-	-	-
Hyalella azteca	0(0)	0	157(17)	15	-	-	-	-
T. Amphipoda	0(0)	0	157(17)	15	-	-	-	-
Hydracarina	45(15)	6	70(0)	7	-	-	-	-
Hexagenia	0(0)	0	17(17)	2	-	-	-	-
T. Ephemeroptera	0(0)	0	17(17)	2	-	-	-	-
Oecetis	0(0)	0	35(35)	3	-	-	-	-
T. Trichoptera	0(0)	0	35(35)	3	-	-	-	-
Chironomidae	678(45)	90	732(70)	71	-	-	-	-
Total benthos	753(30)	-	1028(17)	-	-	-	-	-
R. smelt larvae	45(15)	100	244(139)	100	-	-	-	-
Total fish larvae	45(15)	-	244(139)	-	-	-	-	-
Total zooplankton	1078(25)	-	364(37)	-	-	-	-	-

Appendix 128. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	36(0)	33	27(27)	10	26(26)	12	0(0)	0
Asellus	0(0)	0	0(0)	0	26(26)	12	0(0)	0
Hyalella azteca	0(0)	0	27(27)	10	26(26)	12	76(76)	17
T. Amphipoda	0(0)	0	27(27)	10	26(26)	12	76(76)	17
Hydracarina	18(18)	17	0(0)	0	26(26)	12	38(38)	8
Caenis	0(0)	0	27(27)	10	0(0)	0	38(38)	8
Hexagenia	0(0)	0	134(27)	50	0(0)	0	229(38)	50
T. Ephemeroptera	0(0)	0	160(53)	60	0(0)	0	267(115)	58
Corixidae	18(18)	17	0(0)	0	26(26)	12	0(0)	0
Ceratopogonidae	18(18)	17	27(27)	10	0(0)	0	0(0)	0
Chironomidae	18(18)	17	27(27)	10	77(26)	37	76(76)	17
Total benthos	107(36)	-	267(53)	-	206(52)	-	458(76)	-
R. smelt larvae	0(0)	0	0(0)	0	0(0)	0	38(38)	50
Damaged larvae	0(0)	0	0(0)	0	0(0)	0	38(38)	50
Total fish larvae	0(0)	0	0(0)	0	0(0)	0	76(76)	-
Total zooplankton	3(1)	-	1(1)	-	<1(<1)	-	<1(<1)	-

Appendix 129. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	125(125)	39	26(26)	2	-	-	-	-
Tubificidae	18(18)	6	0(0)	0	-	-	-	-
<u>Hyalella azteca</u>	0(0)	0	52(0)	4	-	-	-	-
T. Amphipoda	0(0)	0	52(0)	4	-	-	-	-
<u>Eurylophella</u>	18(18)	6	0(0)	0	-	-	-	-
<u>Caenis</u>	0(0)	0	26(26)	2	-	-	-	-
<u>Hexagenia</u>	0(0)	0	103(52)	8	-	-	-	-
Unid. T. Ephemeroptera	18(18)	6	0(0)	0	-	-	-	-
T. Ephemeroptera	36(36)	11	129(77)	10	-	-	-	-
Ceratopogonidae	0(0)	0	26(26)	2	-	-	-	-
Chironomidae	143(36)	44	1031(52)	82	-	-	-	-
Total benthos	312(36)	-	1263(180)	-	-	-	-	-
R. smelt larvae	18(18)	100	0(0)	0	-	-	-	-
Total fish larvae	18(18)	-	0(0)	-	-	-	-	-
Total zooplankton	7(2)	-	21(1)	-	-	-	-	-

Appendix 130. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	16(16)	14	47(47)	22	45(45)	50	0(0)	0
Asellus	0(0)	0	0(0)	0	23(23)	25	0(0)	0
Hyalella azteca	0(0)	0	23(23)	11	0(0)	0	67(67)	33
T. Amphipoda	0(0)	0	23(23)	11	0(0)	0	67(67)	33
Hydracarina	31(31)	29	47(47)	22	0(0)	0	0(0)	0
Caenis	0(0)	0	23(23)	11	0(0)	0	0(0)	0
Hexagenia	0(0)	0	47(0)	22	0(0)	0	101(34)	50
T. Ephemeroptera	0(0)	0	70(23)	33	0(0)	0	101(34)	50
Corixidae	0(0)	0	0(0)	0	0(0)	0	34(34)	17
Chironomidae	63(0)	57	23(23)	11	23(23)	25	0(0)	0
Total benthos	110(16)	-	211(117)	-	90(90)	-	201(67)	-
Total zooplankton	<1(<1)	-	<1(<1)	-	<1(0)	-	<1(<1)	-

Appendix 131. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	31(31)	25	45(0)	7	-	-	-	-
Tubificidae	16(16)	12	0(0)	0	-	-	-	-
Asellus	31(0)	25	0(0)	0	-	-	-	-
Hydracarina	0(0)	0	23(23)	3	-	-	-	-
Hexagenia	16(16)	12	0(0)	0	-	-	-	-
T. Ephemeroptera	16(16)	12	0(0)	0	-	-	-	-
Unid. Trichoptera	0(0)	0	23(23)	3	-	-	-	-
T. Trichoptera	0(0)	0	23(23)	3	-	-	-	-
Ceratopogonidae	0(0)	0	23(23)	3	-	-	-	-
Chironomidae	31(31)	25	543(45)	83	-	-	-	-
Total benthos	125(63)	-	656(68)	-	-	-	-	-
Total zooplankton	4(<1)	-	10(2)	-	-	-	-	-

Appendix 132. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	103(0)	67	86(29)	13	0(0)	0	0(0)	0
Hyalella azteca	0(0)	0	57(0)	8	0(0)	0	54(54)	12
T. Amphipoda	0(0)	0	57(0)	8	0(0)	0	54(54)	12
Hydracarina	0(0)	0	29(29)	4	53(53)	67	54(54)	12
Caenis	26(26)	17	171(57)	25	0(0)	0	0(0)	0
Hexagenia	0(0)	0	229(0)	33	0(0)	0	215(215)	50
T. Ephemeroptera	26(26)	17	400(57)	58	0(0)	0	215(215)	50
Corixidae	0(0)	0	29(29)	4	0(0)	0	54(54)	12
Chironomidae	26(26)	17	86(86)	13	27(27)	33	54(54)	12
Total benthos	155(0)	-	686(57)	-	80(80)	-	430(323)	-
Total zooplankton	2(0)	-	1(<1)	-	<1(<1)	-	<1(<1)	-

Appendix 133. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Hydra	0(0)	0	0(0)	0	29(29)	33	0(0)	0
Naididae	28(28)	50	61(61)	5	29(29)	33	0(0)	0
Hyalella azteca	0(0)	0	245(61)	18	0(0)	0	0(0)	0
T. Amphipoda	0(0)	0	245(61)	18	0(0)	0	0(0)	0
Hydracarina	0(0)	0	123(61)	9	0(0)	0	172(172)	23
Caenis	0(0)	0	184(123)	14	0(0)	0	57(57)	8
Hexagenia	0(0)	0	276(31)	20	0(0)	0	115(115)	15
Unid. T. Ephemeroptera	0(0)	0	0(0)	0	29(29)	33	0(0)	0
T. Ephemeroptera	0(0)	0	460(92)	34	29(29)	33	172(172)	23
Corixidae	0(0)	0	276(31)	20	0(0)	0	345(115)	46
Oecetis	0(0)	0	61(61)	5	0(0)	0	0(0)	0
Unid. Trichoptera	28(28)	50	0(0)	0	0(0)	0	0(0)	0
T. Trichoptera	28(28)	50	61(61)	5	0(0)	0	0(0)	0
Chironomidae	0(0)	0	123(0)	9	0(0)	0	57(57)	8
Total benthos w/o *Hydra*	55(55)	100	1350(0)	100	57(57)	67	747(57)	100
Total benthos	55(55)	-	1350(0)	-	86(86)	-	747(57)	-
Total zooplankton	<1(<1)	-	<1(<1)	-	<1(<1)	-	<1(<1)	-

Appendix 134. Mean density ($\bar{X}$), standard error (SE), and percentage of respective totals (%T) for benthos (no./1000 m^3), ichthyoplankton (no./1000 m^3), and zooplankton (no./m^3) components in drift samples collected from the St. Marys River, 1985.

	Point aux Frenes Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Taxon	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T	$\bar{X}$(SE)	%T
Naididae	64(21)	27	357(119)	12	241(27)	47	179(89)	11
Tubificidae	0(0)	0	0(0)	0	53(0)	11	134(45)	9
Polychaeta	0(0)	0	30(30)	1	0(0)	0	0(0)	0
<u>Asellus</u>	0(0)	0	89(30)	3	27(27)	5	89(89)	6
<u>Gammarus</u>	21(21)	9	30(30)	1	0(0)	0	0(0)	0
<u>Hyalella azteca</u>	0(0)	0	208(30)	7	0(0)	0	45(45)	3
T. Amphipoda	21(21)	9	238(60)	8	0(0)	0	45(45)	3
Hydracarina	43(43)	18	208(89)	7	53(53)	11	89(89)	6
<u>Baetis</u>	0(0)	0	30(30)	1	0(0)	0	0(0)	0
<u>Stenonema</u>	0(0)	0	30(30)	1	0(0)	0	0(0)	0
<u>Eurylophella</u>	0(0)	0	30(30)	1	0(0)	0	0(0)	0
<u>Caenis</u>	0(0)	0	327(149)	11	0(0)	0	89(0)	6
<u>Ephemera</u>	0(0)	0	0(0)	0	0(0)	0	45(45)	3
<u>Hexagenia</u>	0(0)	0	208(89)	7	0(0)	0	179(0)	11
T. Ephemeroptera	0(0)	0	625(30)	21	0(0)	0	313(45)	20
Corixidae	106(21)	45	744(30)	25	80(27)	16	223(45)	14
<u>Mystacides</u>	0(0)	0	30(30)	1	0(0)	0	0(0)	0
T. Trichoptera	0(0)	0	30(30)	1	0(0)	0	0(0)	0
Chironomidae	0(0)	0	685(89)	23	53(0)	11	491(223)	31
Total benthos	234(64)	-	3006(208)	-	508(80)	-	1563(45)	-
Damaged larvae	21(21)	100	89(89)	100	0(0)	0	0(0)	0
Total fish larvae	21(21)	-	89(89)	-	0(0)	-	0(0)	0
Total zooplankton	<1(<1)	-	2(1)	-	<1(<1)	-	<1(<1)	-

Appendix 135. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	47	1	0	0	14	<1
Benthos	4	<1	298	5	2	<1	216	1
Mysis relicta	0	0	25	<1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	8893	>99	5137	94	12389	>99	14181	98
Zooplankton	5126	58	2818	51	8249	67	7447	52
Detritus	3767	42	2319	42	4140	33	6735	47
Seston (ash-free)	329	-	136	-	224	-	518	-
Total	8897	-	5481	-	12391	-	14411	-

Appendix 136. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	31	<1	0	0	6	<1
Benthos	3	<1	226	3	10	<1	342	3
Mysis relicta	0	0	30	<1	0	0	104	1
Larval fish	0	0	0	0	0	0	0	0
Seston	10751	>99	7869	97	4639	>99	11621	97
Zooplankton	5130	48	4337	53	1813	39	5442	45
Detritus	5621	52	3533	43	2827	61	6179	52
Seston (ash-free)	374	-	386	-	169	-	345	-
Total	10754	-	8127	-	4649	-	11969	-

Appendix 137. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	50	1	131	3	43	1	68	1
Benthos	59	1	318	6	7	<1	267	5
Mysis relicta	0	0	41	1	0	0	14	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	3913	97	4692	91	6557	99	4827	94
Zooplankton	2853	71	1620	32	3793	57	2346	45
Detritus	1060	26	3072	60	2764	42	2481	48
Seston (ash-free)	84	-	251	-	426	-	172	-
Total	4022	-	5140	-	6607	-	5162	-

Appendix 138. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

Parameter	Frechette Point Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	15	<1
Benthos	5	<1	98	1	1	<1	148	2
Mysis relicta	0	0	17	<1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	3828	>99	7999	99	3137	>99	8905	98
Zooplankton	3151	**	3761	46	1373	44	3243	36
Detritus	**	**	4238	52	1764	56	5662	62
Seston (ash-free)	-	-	460	-	139	-	698	-
Total	3833	-	8097	-	3138	-	9068	-

Appendix 139. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Frechette Point Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	2	<1	-	-	-	-
Benthos	6	<1	40	<1	-	-	-	-
Mysis relicta	0	0	6	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	9018	>99	8139	99	-	-	-	-
Zooplankton	8443	**	3952	48	-	-	-	-
Detritus	**	**	4188	51	-	-	-	-
Seston (ash-free)	-	-	1288	-	-	-	-	-
Total	9024	-	8181	-	-	-	-	-

Appendix 140. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	45	1	99	1	12	<1	947	10
Benthos	41	1	340	4	18	1	974	10
Mysis relicta	0	0	14	<1	0	0	20	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	3482	98	7607	95	3015	99	7519	80
Zooplankton	2059	58	1800	22	1315	43	2582	27
Detritus	1423	40	5808	72	1701	56	4938	52
Seston (ash-free)	641	-	1280	-	281	-	1412	-
Total	3569	-	8046	-	3045	-	9441	-

Appendix 141. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	56	<1	139	1	-	-	-	-
Benthos	62	1	146	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	11617	99	11569	98	-	-	-	-
Zooplankton	5586	48	3412	29	-	-	-	-
Detritus	6032	51	8157	69	-	-	-	-
Seston (ash-free)	5963	-	4400	-	-	-	-	-
Total	11735	-	11855	-	-	-	-	-

Appendix 142. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	3	<1	279	1	9	<1	0	0
Benthos	<1	<1	173	1	12	<1	79	1
Mysis relicta	0	0	42	<1	0	0	30	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	15898	>99	26357	98	16880	>99	6378	99
Zooplankton	5261	33	12923	48	9284	55	3498	54
Detritus	10637	67	13434	50	7596	45	2880	45
Seston (ash-free)	388	-	1719	-	2965	-	169	-
Total	15901	-	26809	-	16902	-	6457	-

Appendix 143. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	51	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	21907	>99	23491	>99	-	-	-	-
Zooplankton	18384	84	16280	69	-	-	-	-
Detritus	3523	16	7211	31	-	-	-	-
Seston (ash-free)	639	-	1321	-	-	-	-	-
Total	21907	-	23542	-	-	-	-	-

Appendix 144. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	74	1	49	<1	187	2	43	1
Benthos	1	<1	165	1	2	<1	74	1
Mysis relicta	0	0	0	0	0	0	3	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	7153	99	14938	99	10025	98	7675	99
Zooplankton	3753	52	7948	52	7252	71	3745	48
Detritus	3400	47	6990	46	2773	27	3930	50
Seston (ash-free)	159	-	479	-	253	-	204	-
Total	7228	-	15153	-	10214	-	7792	-

Appendix 145. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	30	<1	60	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	12011	>99	18158	>99	-	-	-	-
Zooplankton	7980	66	11173	61	-	-	-	-
Detritus	4031	33	6985	38	-	-	-	-
Seston (ash-free)	1692	-	860	-	-	-	-	-
Total	12041	-	18218	-	-	-	-	-

Appendix 146. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	19	<1	31	<1	1	<1	3	<1
Benthos	23	1	356	5	4	<1	166	5
Mysis relicta	0	0	13	<1	0	0	17	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	4064	99	7177	95	3185	>99	3469	95
Zooplankton	1928	47	2154	28	1638	51	1567	43
Detritus	2137	52	5023	66	1547	48	1902	52
Seston (ash-free)	344	-	534	-	81	-	471	-
Total	4106	-	7564	-	3190	-	3638	-

Appendix 147. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	8	<1	-	-	-	-
Benthos	1	<1	225	2	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	27848	>99	12448	98	-	-	-	-
Zooplankton	26291	94	5177	41	-	-	-	-
Detritus	1557	6	7271	57	-	-	-	-
Seston (ash-free)	464	-	2597	-	-	-	-	-
Total	27850	-	12680	-	-	-	-	-

Appendix 148. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	<1	<1	6	<1	0	0	182	4
Benthos	1	<1	1	<1	1	<1	24	1
Mysis relicta	0	0	0	0	0	0	16	1
Larval fish	0	0	0	0	0	0	0	0
Seston	5199	>99	3096	>99	3792	>99	4517	96
Zooplankton	3368	65	1866	60	2279	60	2696	57
Detritus	1831	35	1231	40	1513	40	1821	39
Seston (ash-free)	176	-	-	-	71	-	145	-
Total	5201	-	3104	-	3793	-	4723	-

Appendix 149. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Winter - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	1	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	5701	>99	12256	>99	-	-	-	-
Zooplankton	4549	80	5310	43	-	-	-	-
Detritus	1153	20	6947	57	-	-	-	-
Seston (ash-free)	177	-	264	-	-	-	-	-
Total	5702	-	12257	-	-	-	-	-

Appendix 150. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Frechette Point Winter - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	-
Benthos	1	<1	0	0	1	<1	3	*
Mysis relicta	0	0	0	0	0	0	0	*
Larval fish	0	0	0	0	0	0	0	-
Seston	9307	>99	843	100	1064	>99	1121	-
Zooplankton	3536	38	576	68	622	58	816	-
Detritus	5771	62	267	32	442	42	306	-
Seston (ash-free)	247	-	-	-	160	-	42	-
Total	9308	-	843	-	1065	-	1474	*

Appendix 151. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Frechette Point Winter - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	646	12	0	0	-	-	-	-
Benthos	2	<1	2	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	4759	88	3564	>99	-	-	-	-
Zooplankton	5368	**	2093	59	-	-	-	-
Detritus	**	**	1471	41	-	-	-	-
Seston (ash-free)	278	-	512	-	-	-	-	-
Total	5407	-	3566	-	-	-	-	-

Appendix 152. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Winter - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	22	<1	0	0
Benthos	<1	<1	1	<1	4	<1	<1	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	3441	>99	4421	>99	4967	99	3022	>99
Zooplankton	1968	57	2511	57	3076	62	2468	82
Detritus	1474	43	1910	43	1891	38	555	18
Seston (ash-free)	82	-	189	-	391	-	83	-
Total	3441	-	4422	-	4992	-	3022	-

Appendix 153. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

Parameter	Frechette Point Winter - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	5	<1	0	0	206	4	0	0
Benthos	3	<1	2	<1	2	<1	0	0
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	7100	>99	4482	>99	5379	96	1063	100
Zooplankton	4807	**	2332	52	2241	40	924	87
Detritus	**	**	2150	48	3139	56	139	13
Seston (ash-free)	277	-	856	-	335	-	22	-
Total	7108	-	4484	-	5587	-	1063	-

Appendix 154. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Winter - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	1	<1	34	1	<1	<1	6	<1
Mysis relicta	0	0	34	1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	5734	>99	5268	99	6217	>99	2900	>99
Zooplankton	3395	59	3260	61	3760	60	1669	57
Detritus	2339	41	2008	38	2457	40	1231	42
Seston (ash-free)	237	-	-	-	-	-	331	-
Total	5735	-	5301	-	6217	-	2907	-

Appendix 155. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	58	1	2	<1	147	1	14	1
Benthos	20	<1	88	9	100	<1	301	19
Mysis relicta	0	0	30	3	0	0	52	3
Larval fish	<1	<1	1	<1	<1	<1	1	<1
Seston	7637	99	865	87	27312	99	1264	80
Zooplankton	3135	41	138	14	1009	4	112	7
Detritus	4501	58	728	73	26303	95	1153	73
Seston (ash-free)	2068	-	249	-	2002	-	395	-
Total	7715	-	956	-	27558	-	1580	-

Appendix 156. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	8518	53	2	<1	87	2	0	0
Benthos	21	<1	28	5	27	1	55	7
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	1	<1	<1	<1	1	<1	1	<1
Seston	7632	47	550	95	4959	98	785	93
Zooplankton	4461	28	199	34	2034	40	222	26
Detritus	3171	20	351	61	2925	58	563	67
Seston (ash-free)	2530	-	155	-	1284	-	302	-
Total	16172	-	580	-	5074	-	841	-

Appendix 157. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	49	<1	7	1	877	6	5	<1
Benthos	29	<1	54	6	69	<1	174	16
Mysis relicta	0	0	0	0	0	0	79	7
Larval fish	<1	<1	0	0	<1	<1	1	<1
Seston	67685	>99	856	93	12957	93	890	83
Zooplankton	1572	2	93	10	1905	14	150	14
Detritus	66113	98	763	83	11052	79	740	69
Seston (ash-free)	8133	-	173	-	8864	-	408	-
Total	67763	-	917	-	13903	-	1070	-

Appendix 158. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Frechette Point Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	69	1	12	1	83	2	1	-
Benthos	18	<1	38	2	26	1	64	*
Mysis relicta	0	0	6	<1	0	0	0	*
Larval fish	1	<1	1	<1	2	<1	<1	-
Seston	7332	99	1551	97	3351	97	1870	-
Zooplankton	2629	35	1184	74	1665	48	1204	-
Detritus	4703	63	367	23	1686	49	666	-
Seston (ash-free)	3932	-	227	-	915	-	269	-
Total	7420	-	1602	-	3462	-	1533	*

Appendix 159. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	2	<1	<1	<1	-	-	-	-
Benthos	15	<1	59	2	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	1	<1	2	<1	-	-	-	-
Seston	6336	>99	3697	98	-	-	-	-
Zooplankton	2550	40	1632	43	-	-	-	-
Detritus	3786	60	2065	55	-	-	-	-
Seston (ash-free)	1357	-	1669	-	-	-	-	-
Total	6354	-	3758	-	-	-	-	-

Appendix 160. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	71	1	33	<1	60	2	6	1
Benthos	66	1	135	1	37	1	91	9
Mysis relicta	0	0	1	<1	0	0	2	<1
Larval fish	1	<1	<1	<1	<1	<1	<1	<1
Seston	4590	97	11722	99	3615	97	902	90
Zooplankton	2076	44	447	4	1237	33	446	45
Detritus	2514	53	11276	95	2378	64	456	46
Seston (ash-free)	1573	-	1679	-	1449	-	265	-
Total	4727	-	11891	-	3713	-	999	-

Appendix 161. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	21	<1	6	<1	-	-	-	-
Benthos	15	<1	124	4	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	1	<1	1	<1	-	-	-	-
Seston	5452	99	3292	96	-	-	-	-
Zooplankton	1481	27	418	12	-	-	-	-
Detritus	3972	72	2874	84	-	-	-	-
Seston (ash-free)	2485	-	2049	-	-	-	-	-
Total	5489	-	3425	-	-	-	-	-

Appendix 162. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	33	<1	24	<1	66	2	29	1
Benthos	13	<1	32	1	13	<1	23	1
Mysis relicta	3	<1	19	<1	1	<1	20	1
Larval fish	1	<1	<1	<1	1	<1	1	<1
Seston	6893	99	4645	99	3656	98	2320	98
Zooplankton	4575	66	3669	78	1837	49	1687	71
Detritus	2318	33	976	21	1819	49	634	27
Seston (ash-free)	1840	-	352	-	816	-	199	-
Total	6940	-	4701	-	3735	-	2372	-

Appendix 163. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	60	<1	35	<1	-	-	-	-
Benthos	22	<1	52	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	2	<1	3	<1	-	-	-	-
Seston	17165	>99	8413	99	-	-	-	-
Zooplankton	6869	40	6833	80	-	-	-	-
Detritus	10296	60	1580	19	-	-	-	-
Seston (ash-free)	9238	-	2622	-	-	-	-	-
Total	17249	-	8503	-	-	-	-	-

Appendix 164. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	48	<1	18	<1	148	2	1	<1
Benthos	28	<1	57	1	28	<1	6	<1
Mysis relicta	0	0	26	<1	1	<1	0	0
Larval fish	2	<1	<1	<1	2	<1	1	<1
Seston	14119	99	5447	99	6279	97	2193	>99
Zooplankton	6468	46	3505	63	2997	46	1190	54
Detritus	7652	54	1942	35	3282	51	1004	46
Seston (ash-free)	3764	-	567	-	1358	-	361	-
Total	14197	-	5523	-	6456	-	2202	-

Appendix 165. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	35	<1	31	<1	-	-	-	-
Benthos	24	<1	29	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	2	<1	3	<1	-	-	-	-
Seston	14432	>99	7643	99	-	-	-	-
Zooplankton	3458	24	5174	67	-	-	-	-
Detritus	10974	76	2469	32	-	-	-	-
Seston (ash-free)	6355	-	1763	-	-	-	-	-
Total	14493	-	7706	-	-	-	-	-

Appendix 166. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	111	<1	217	6	268	2	31	2
Benthos	33	<1	17	<1	65	<1	19	1
Mysis relicta	<1	<1	0	0	0	0	0	0
Larval fish	12	<1	29	1	2	<1	1	<1
Seston	86248	>99	3148	92	15618	98	1734	97
Zooplankton	2837	3	2402	70	3887	24	845	47
Detritus	83412	97	746	22	11731	74	890	50
Seston (ash-free)	68548	-	307	-	5872	-	321	-
Total	86404	-	3411	-	15953	-	1786	-

Appendix 167. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	41	<1	104	1	-	-	-	-
Benthos	67	<1	27	<1	-	-	-	-
Mysis relicta	0	0	2	<1	-	-	-	-
Larval fish	4	<1	3	<1	-	-	-	-
Seston	28220	>99	10127	99	-	-	-	-
Zooplankton	3619	13	6059	59	-	-	-	-
Detritus	24602	87	4069	40	-	-	-	-
Seston (ash-free)	17461	-	3179	-	-	-	-	-
Total	28332	-	10261	-	-	-	-	-

Appendix 168. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	36570	28	25	<1	64	1	2	<1
Benthos	266	<1	61	1	58	1	17	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	2	<1	2	<1	3	<1	<1	<1
Seston	92538	72	5113	98	9926	99	3037	99
Zooplankton	2325	2	2887	56	2764	27	2193	72
Detritus	90213	70	2226	43	7163	71	845	28
Seston (ash-free)	19920	-	574	-	2807	-	379	-
Total	129380	-	5201	-	10052	-	3056	-

Appendix 169. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Frechette Point Summer - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	336	-	13	<1	-	-	-	-
Benthos	43	-	27	<1	-	-	-	-
Mysis relicta	0	-	0	0	-	-	-	-
Larval fish	1	-	4	<1	-	-	-	-
Seston	276	*	10623	>99	-	-	-	-
Zooplankton	1677	-	4705	44	-	-	-	-
Detritus	25072	*	5919	55	-	-	-	-
Seston (ash-free)	5156	*	4583	-	-	-	-	-
Total	28060	*	10667	-	-	-	-	-

Appendix 170. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Frechette Point Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	624	4	25	1	338	3	0	0
Benthos	88	1	220	5	117	1	16	1
Mysis relicta	0	0	0	0	3	<1	0	0
Larval fish	1	<1	1	<1	1	<1	2	<1
Seston	14858	95	3922	94	12244	96	1818	99
Zooplankton	3570	23	2111	51	2341	18	877	48
Detritus	11288	72	1812	43	9903	78	942	51
Seston (ash-free)	5192	-	1195	-	4201	-	461	-
Total	15570	-	4168	-	12700	-	1836	-

Appendix 171. *Average biomass* [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

Parameter	Frechette Point Summer - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	233	-	118	2	-	-	-	-
Benthos	122	-	152	2	-	-	-	-
<u>Mysis relicta</u>	0	-	0	0	-	-	-	-
Larval fish	<1	-	3	<1	-	-	-	-
Seston	52039	*	7147	96	-	-	-	-
Zooplankton	5370	-	1267	17	-	-	-	-
Detritus	42910	*	5880	79	-	-	-	-
Seston (ash-free)	45716	*	4164	-	-	-	-	-
Total	52487	*	7420	-	-	-	-	-

Appendix 172. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Frechette Point Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	132	1	92	8	92	1	0	0
Benthos	48	<1	35	3	61	1	73	4
Mysis relicta	0	0	0	0	0	0	51	3
Larval fish	1	<1	1	<1	1	<1	<1	<1
Seston	12688	99	956	88	9000	98	1707	96
Zooplankton	3793	29	2172	**	1944	21	1322	74
Detritus	8895	69	**	**	7057	77	385	22
Seston (ash-free)	4557	-	616	-	2286	-	139	-
Total	12870	-	1083	-	9154	-	1779	-

Appendix 173. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Frechette Point Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	468	3	65	1	299	1	<1	<1
Benthos	127	1	51	1	75	<1	22	1
Mysis relicta	46	<1	0	0	0	0	0	0
Larval fish	1	<1	3	<1	1	<1	1	<1
Seston	17779	97	5857	98	36008	99	2017	99
Zooplankton	2994	16	2005	34	1708	5	511	25
Detritus	14786	80	3852	64	34300	94	1506	74
Seston (ash-free)	9919	-	1369	-	4282	-	244	-
Total	18375	-	5976	-	36383	-	2041	-

Appendix 174. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Frechette Point Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	546	3	76	<1	495	<1	176	7
Benthos	261	1	40	<1	34	<1	49	2
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	<1	<1	<1	<1	1	<1
Seston	19307	96	59481	>99	517650	>99	2344	91
Zooplankton	3354	17	1958	3	1302	<1	3004	**
Detritus	15953	79	57524	97	516350	>99	**	**
Seston (ash-free)	7219	-	5354	-	68318	-	414	-
Total	20115	-	59598	-	518180	-	2570	-

Appendix 175. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	615	10	0	0	248	7
Mysis relicta	0	0	511	8	0	0	237	7
Larval fish	0	0	0	0	0	0	0	0
Seston	7331	100	5694	90	7066	100	3195	93
Zooplankton	5903	81	3934	62	5330	75	3391	**
Detritus	1428	19	1760	28	1736	25	**	**
Seston (ash-free)	155	-	151	-	-	-	102	-
Total	7331	-	6309	-	7066	-	3443	-

Appendix 174. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Frechette Point Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	546	3	76	<1	495	<1	176	7
Benthos	261	1	40	<1	34	<1	49	2
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	<1	<1	<1	<1	1	<1
Seston	19307	96	59481	>99	517650	>99	2344	91
Zooplankton	3354	17	1958	3	1302	<1	3004	**
Detritus	15953	79	57524	97	516350	>99	**	**
Seston (ash-free)	7219	-	5354	-	68318	-	414	-
Total	20115	-	59598	-	518180	-	2570	-

Appendix 175. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macr phytes	0	0	0	0	0	0	0	0
Benthos	0	0	615	10	0	0	248	7
Mysis relicta	0	0	511	8	0	0	237	7
Larval fish	0	0	0	0	0	0	0	0
Seston	7331	100	5694	90	7066	100	3195	93
Zooplankton	5903	81	3934	62	5330	75	3391	**
Detritus	1428	19	1760	28	1736	25	**	**
Seston (ash-free)	155	-	151	-	-	-	102	-
Total	7331	-	6309	-	7066	-	3443	-

Appendix 176. Average biomass [$\bar{X}$, dry weight (mg/1000 m³)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m³) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

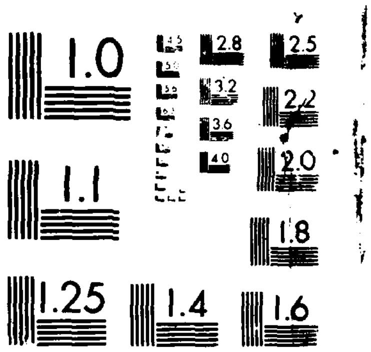
	Lake Nicolet Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	159	1	0	0	28	<1
<u>Mysis relicta</u>	0	0	159	1	0	0	28	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	4203	100	11558	99	4434	81	7496	81
Zooplankton	4727	**	5802	50	3591	66	4998	54
Detritus	**	**	5756	49	843	15	2499	27
Seston (ash-free)	111	-	1182	-	253	-	222	-
Total	4203	-	11717	-	4434	-	7525	-

Appendix 177. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	93	1	0	0	0	0
Benthos	0	0	93	1	0	0	17	<1
Mysis relicta	0	0	0	0	0	0	16	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	4792	100	11751	99	3190	81	2822	81
Zooplankton	4054	85	3136	26	2323	59	1871	53
Detritus	739	15	8615	73	867	22	951	27
Seston (ash-free)	147	-	660	-	152	-	122	-
Total	4792	-	11844	-	3190	-	2839	-

AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86 5/7

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL



MICROCOPY RESOLUTION TEST CHA

NATIONAL BUREAU OF STANDARDS 1963

Appendix 178. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	<1	<1	88	1	0	0	40	1
Mysis relicta	0	0	85	1	0	0	38	1
Larval fish	0	0	0	0	0	0	0	0
Seston	9888	100	5944	99	5404	100	5214	99
Zooplankton	6357	64	3843	64	6568	**	4483	**
Detritus	3531	36	2101	35	**	**	**	**
Seston (ash-free)	252	-	109	-	119	-	112	-
Total	9888	-	6032	-	5404	-	5254	-

Appendix 179. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	151	1	-	-	-	-
Mysis relicta	0	0	149	1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	14458	83	11547	99	-	-	-	-
Zooplankton	10871	63	7068	60	-	-	-	-
Detritus	3587	21	4479	38	-	-	-	-
Seston (ash-free)	349	-	331	-	-	-	-	-
Total	14458	-	11698	-	-	-	-	-

Appendix 180. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Lake Nicolet Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	6	<1	0	0
Benthos	<1	<1	128	1	0	0	3	<1
Mysis relicta	0	0	125	1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	8704	>99	9502	99	4567	>99	2475	>99
Zooplankton	5675	65	3478	36	3597	79	2123	86
Detritus	3029	35	6024	63	970	21	352	14
Seston (ash-free)	233	-	1613	-	114	-	91	-
Total	8704	-	9629	-	4573	-	2478	-

Appendix 181. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	50	1	-	-	-	-
Mysis relicta	0	0	44	1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	9193	>99	4854	99	-	-	-	-
Zooplankton	7435	**	3407	69	-	-	-	-
Detritus	**	**	1447	30	-	-	-	-
Seston (ash-free)	446	-	178	-	-	-	-	-
Total	9193	-	4904	-	-	-	-	-

Appendix 182. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	106	1	0	0
Benthos	0	0	28	<1	0	0	15	<1
Mysis relicta	0	0	27	<1	0	0	15	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	14389	100	11082	>99	10659	99	3803	>99
Zooplankton	11001	76	5901	53	6653	62	4768	**
Detritus	3388	24	5182	47	4006	37	**	**
Seston (ash-free)	362	-	176	-	581	-	118	-
Total	14389	-	11111	-	10765	-	3818	-

Appendix 183. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	53	<1	-	-	-	-
Mysis relicta	0	0	49	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	19879	>99	29040	>99	-	-	-	-
Zooplankton	14928	75	18890	65	-	-	-	-
Detritus	4951	25	10150	35	-	-	-	-
Seston (ash-free)	450	-	659	-	-	-	-	-
Total	19879	-	29093	-	-	-	-	-

Appendix 184. Average biomass [$\bar{X}$, dry weight (mg/1000 m³)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m³) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	<1	<1	62	1	0	0	62	1
Mysis relicta	0	0	59	1	0	0	60	1
Larval fish	0	0	0	0	0	0	0	0
Seston	9600	>99	5284	99	8018	100	4896	99
Zooplankton	6036	63	5111	**	5979	75	3845	78
Detritus	3565	37	**	**	2040	25	1051	21
Seston (ash-free)	219	-	182	-	343	-	59	-
Total	9601	-	5345	-	8018	-	4958	-

Appendix 185. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	2	<1	-	-	-	-
Benthos	<1	<1	40	<1	-	-	-	-
Mysis relicta	0	0	34	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	17098	>99	24017	>99	-	-	-	-
Zooplankton	13175	77	14012	58	-	-	-	-
Detritus	3923	23	10004	42	-	-	-	-
Seston (ash-free)	478	-	647	-	-	-	-	-
Total	17098	-	24058	-	-	-	-	-

Appendix 186. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Lake Nicolet Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	54	3	6	<1	11	1	0	0
Benthos	<1	<1	46	1	<1	<1	21	1
Mysis relicta	0	0	39	1	0	0	15	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	1826	97	7124	>99	1085	99	3609	99
Zooplankton	1214	65	3828	53	672	61	2840	78
Detritus	612	33	3297	46	413	38	769	21
Seston (ash-free)	23	-	171	-	125	-	65	-
Total	1880	-	7177	-	1096	-	3630	-

Appendix 187. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	5	<1	31	<1	-	-	-	-
Benthos	<1	<1	33	<1	-	-	-	-
Mysis relicta	0	0	6	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	4115	>99	8377	>99	-	-	-	-
Zooplankton	3039	74	3933	47	-	-	-	-
Detritus	1077	26	4445	53	-	-	-	-
Seston (ash-free)	885	-	1390	-	-	-	-	-
Total	4121	-	8441	-	-	-	-	-

Appendix 188. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Lake Nicolet Winter - Station 6 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	4	<1	0	0	7	<1
Mysis relicta	0	0	0	0	0	0	7	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	5989	100	6384	>99	10103	100	8863	>99
Zooplankton	5851	98	3895	61	8407	83	6163	69
Detritus	138	2	2489	39	1697	17	2701	30
Seston (ash-free)	261	-	239	-	548	-	325	-
Total	5989	-	6387	-	10103	-	8870	-

Appendix 189. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 6 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	<1	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	12341	>99	8190	>99	-	-	-	-
Zooplankton	8760	71	6038	74	-	-	-	-
Detritus	3581	29	2152	26	-	-	-	-
Seston (ash-free)	331	-	245	-	-	-	-	-
Total	12341	-	8190	-	-	-	-	-

Appendix 190. Average biomass [$\bar{X}$, dry weight (mg/1000 m³)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m³) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	<1	<1	0	0	3	<1	4	<1
Mysis relicta	<1	<1	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	9709	>99	5225	100	12595	>99	6042	>99
Zooplankton	5459	56	3058	59	11721	**	4904	81
Detritus	4250	44	2168	41	**	**	1138	19
Seston (ash-free)	174	-	261	-	328	-	95	-
Total	9709	-	5225	-	12598	-	6045	-

Appendix 191. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 6 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	1	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	14796	>99	4537	>99	-	-	-	-
Zooplankton	8010	54	2966	65	-	-	-	-
Detritus	6786	46	1571	35	-	-	-	-
Seston (ash-free)	483	-	122	-	-	-	-	-
Total	14796	-	4539	-	-	-	-	-

Appendix 192. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	8	<1	0	0	0	0
Benthos	0	0	59	1	<1	<1	25	<1
Mysis relicta	0	0	38	1	0	0	22	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	2848	100	5704	99	4332	>99	5311	>99
Zooplankton	1916	67	4555	79	3382	78	4520	85
Detritus	933	33	1150	20	950	22	791	15
Seston (ash-free)	46	-	641	-	124	-	73	-
Total	2848	-	5771	-	4332	-	5336	-

Appendix 193. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 6 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	29	1	0	0	-	-	-	-
Benthos	1	<1	7	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	3022	99	4639	>99	-	-	-	-
Zooplankton	2909	**	2890	62	-	-	-	-
Detritus	**	**	1749	38	-	-	-	-
Seston (ash-free)	183	-	178	-	-	-	-	-
Total	3053	-	4646	-	-	-	-	-

Appendix 194. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 7 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	41	1	0	0	10	<1
Mysis relicta	0	0	41	1	0	0	10	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	4076	100	3926	99	3509	100	3808	>99
Zooplankton	3211	**	2631	66	3455	98	3034	79
Detritus	**	**	1295	33	54	2	774	20
Seston (ash-free)	78	-	-	-	168	-	87	-
Total	4076	-	3967	-	3509	-	3818	-

Appendix 195. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 7 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	12	<1	-	-	-	-
Mysis relicta	0	0	8	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	5206	>99	4602	>99	-	-	-	-
Zooplankton	4206	**	4056	88	-	-	-	-
Detritus	**	**	547	12	-	-	-	-
Seston (ash-free)	184	-	-	-	-	-	-	-
Total	5206	-	4615	-	-	-	-	-

Appendix 196. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

Parameter	Lake Nicolet Winter - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	6	<1	0	0	4	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	3659	100	2605	>99	3192	100	4502	>99
Zooplankton	3132	86	1935	74	3023	**	3768	84
Detritus	528	14	671	26	**	**	735	16
Seston (ash-free)	315	-	81	-	79	-	127	-
Total	3659	-	2612	-	3192	-	4506	-

Appendix 197. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 7 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	3	<1	6	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	4735	>99	2828	>99	-	-	-	-
Zooplankton	2596	55	2245	79	-	-	-	-
Detritus	2139	45	584	21	-	-	-	-
Seston (ash-free)	105	-	-	-	-	-	-	-
Total	4738	-	2835	-	-	-	-	-

Appendix 198. Average biomass [$\bar{X}$, dry weight ($mg/1000\ m^3$)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston ($mg/1000\ m^3$) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 8 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	48	2	<1	<1	26	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	7915	100	2028	98	3339	>99	3113	99
Zooplankton	5329	67	1960	**	2551	75	2571	82
Detritus	2586	33	**	**	789	24	542	17
Seston (ash-free)	215	-	68	-	120	-	132	-
Total	7915	-	2076	-	3340	-	3140	-

Appendix 199. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Winter - Station 8 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	<1	<1	3	<1	1	<1	0	0
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	2784	>99	1051	>99	2608	>99	3136	100
Zooplankton	2330	84	821	78	1943	74	2428	77
Detritus	454	16	230	22	665	25	709	23
Seston (ash-free)	47	-	-	-	75	-	78	-
Total	2784	-	1055	-	2608	-	3136	-

Appendix 200. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Winter - Station 9 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	43	1	<1	<1	17	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	1301	100	3122	99	4461	>99	4305	>99
Zooplankton	2164	**	1963	62	2636	59	3243	75
Detritus	**	**	1159	37	1825	41	1062	25
Seston (ash-free)	47	-	-	-	132	-	82	-
Total	1301	-	3165	-	4461	-	4321	-

Appendix 201. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	363	21	9	1	0	0	0	0
Benthos	3	<1	107	16	16	2	177	43
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	1	<1	1	<1	2	<1	3	1
Seston	1361	79	534	82	879	98	235	57
Zooplankton	19	1	8	1	219	24	33	8
Detritus	1342	78	526	81	660	74	202	49
Seston (ash-free)	364	-	140	-	360	-	56	-
Total	1728	-	652	-	897	-	415	-

Appendix 202. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Lake Nicolet Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	1	-	21	2	5	<1	0	0
Benthos	12	*	543	39	2	<1	998	65
<u>Mysis relicta</u>	0	-	0	0	0	0	0	0
Larval fish	6	-	8	1	10	<1	18	1
Seston	2982	-	832	59	2207	99	512	33
Zooplankton	1290	-	241	17	1609	72	387	25
Detritus	1692	-	591	42	597	27	125	8
Seston (ash-free)	1779	-	304	-	260	-	66	-
Total	2890	*	1406	-	2222	-	1528	-

Appendix 203. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components. Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	3	1	0	-	0	0
Benthos	5	<1	47	13	31	*	469	60
Mysis relicta	1	<1	0	0	0	-	0	0
Larval fish	1	<1	2	1	1	-	23	3
Seston	26617	>99	322	86	1252	-	295	37
Zooplankton	479	2	28	7	1289	**	167	21
Detritus	26139	98	294	79	**	**	128	16
Seston (ash-free)	3337	-	147	-	116	-	64	-
Total	26623	-	374	-	1424	-	787	-

Appendix 204. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	247	13	0	0	0	0
Benthos	2	<1	1104	58	1	<1	875	29
Mysis relicta	0	0	133	7	0	0	8	<1
Larval fish	7	<1	16	1	9	<1	18	1
Seston	2255	>99	529	28	3555	>99	2135	71
Zooplankton	1872	83	220	12	3070	86	1763	58
Detritus	383	17	309	16	485	14	373	12
Seston (ash-free)	227	-	100	-	685	-	414	-
Total	2264	-	1896	-	3565	-	3029	-

Appendix 205. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	<1	<1	0	0	-	-	-	-
Benthos	3	<1	9	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	22	1	<1	<1	-	-	-	-
Seston	3121	99	723	99	-	-	-	-
Zooplankton	2202	70	5	1	-	-	-	-
Detritus	919	29	719	98	-	-	-	-
Seston (ash-free)	732	-	573	-	-	-	-	-
Total	3147	-	733	-	-	-	-	-

Appendix 206. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	246	20	143	47	0	0	0	0
Benthos	5	<1	44	14	3	1	386	30
Mysis relicta	0	0	0	0	0	0	5	<1
Larval fish	3	<1	3	1	0	0	33	3
Seston	962	79	118	38	238	99	870	68
Zooplankton	738	61	6	2	49	20	717	56
Detritus	225	18	112	37	190	79	154	12
Seston (ash-free)	128	-	26	-	98	-	204	-
Total	1216	-	307	-	241	-	1289	-

Appendix 207. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	886	23	-	-	-	-
Benthos	2	<1	153	4	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	5	<1	12	<1	-	-	-	-
Seston	2896	>99	2814	73	-	-	-	-
Zooplankton	1057	36	399	10	-	-	-	-
Detritus	1840	63	2415	62	-	-	-	-
Seston (ash-free)	1395	-	2297	-	-	-	-	-
Total	2903	-	3865	-	-	-	-	-

Appendix 208. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	6	1	<1	<1	7	<1
Benthos	1	<1	186	23	<1	<1	158	7
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	2	<1	5	1	4	<1	6	<1
Seston	1999	>99	593	75	1264	>99	2157	93
Zooplankton	1435	72	410	52	1144	90	2566	**
Detritus	564	28	183	23	120	9	**	**
Seston (ash-free)	430	-	92	-	129	-	715	-
Total	2003	-	790	-	1269	-	2327	-

Appendix 209. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	43	2	-	-	-	-
Benthos	4	<1	56	3	-	-	-	-
Mysis relicta	0	0	4	<1	-	-	-	-
Larval fish	4	<1	20	1	-	-	-	-
Seston	3629	>99	1907	94	-	-	-	-
Zooplankton	1071	29	612	30	-	-	-	-
Detritus	2558	70	1295	64	-	-	-	-
Seston (ash-free)	1604	-	1019	-	-	-	-	-
Total	3637	-	2027	-	-	-	-	-

Appendix 210. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	125	8	0	0	0	0
Benthos	4	<1	475	31	0	0	370	19
Mysis relicta	0	0	0	0	0	0	<1	<1
Larval fish	8	<1	13	1	1	<1	6	<1
Seston	2118	99	932	60	1647	>99	1621	81
Zooplankton	2459	**	333	22	1242	75	1371	69
Detritus	**	**	599	39	405	25	250	13
Seston (ash-free)	89	-	248	-	309	-	126	-
Total	2130	-	1545	-	1648	-	1996	-

Appendix 211. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	<1	<1	142	3	-	-	-	-
Benthos	10	<1	114	2	-	-	-	-
Mysis relicta	0	0	32	1	-	-	-	-
Larval fish	22	<1	24	1	-	-	-	-
Seston	7133	>99	4555	94	-	-	-	-
Zooplankton	4696	66	586	12	-	-	-	-
Detritus	2437	34	3969	82	-	-	-	-
Seston (ash-free)	2440	-	2994	-	-	-	-	-
Total	7165	-	4835	-	-	-	-	-

Appendix 212. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	89	5	81	5	0	0	5	<1
Benthos	7	<1	141	9	4	<1	739	39
Mysis relicta	0	0	0	0	0	0	6	<1
Larval fish	3	<1	16	1	1	<1	11	1
Seston	1770	95	1286	84	2249	>99	1148	60
Zooplankton	1201	64	477	31	1214	54	1186	**
Detritus	569	30	809	53	1035	46	**	**
Seston (ash-free)	150	-	340	-	777	-	132	-
Total	1869	-	1524	-	2254	-	1904	-

Appendix 213. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	121	1	114	1	-	-	-	-
Benthos	17	<1	118	1	-	-	-	-
Mysis relicta	0	0	4	<1	-	-	-	-
Larval fish	16	<1	55	1	-	-	-	-
Seston	8834	98	9586	97	-	-	-	-
Zooplankton	2127	24	684	7	-	-	-	-
Detritus	6707	75	8902	90	-	-	-	-
Seston (ash-free)	5220	-	8170	-	-	-	-	-
Total	8989	-	9873	-	-	-	-	-

Appendix 214. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	2	<1	29	2	0	0	57	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	10	<1	27	2	14	<1	187	2
Seston	4065	>99	1353	96	4641	>99	10740	98
Zooplankton	3111	76	1535	**	4598	99	7785	71
Detritus	954	23	**	**	43	1	2955	27
Seston (ash-free)	1186	-	481	-	427	-	2744	-
Total	4077	-	1409	-	4654	-	10983	-

Appendix 215. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	2	<1	0	0	3	<1
Benthos	6	<1	22	5	51	3	53	2
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	2	<1	5	1	1	<1	87	3
Seston	7088	>99	450	94	1905	97	2489	95
Zooplankton	4589	65	320	67	1526	78	2507	**
Detritus	2499	35	130	27	379	19	**	**
Seston (ash-free)	1952	-	80	-	472	-	242	-
Total	7096	-	479	-	1956	-	2633	-

Appendix 216. Average biomass [$\bar{X}$, dry weight ($mg/1000\ m^3$)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston ($mg/1000\ m^3$) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 6 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	28	3	0	0	0	0	0	0
Benthos	3	<1	3	<1	1	<1	12	1
Mysis relicta	0	0	0	0	0	0	3	<1
Larval fish	6	1	3	<1	34	1	3	<1
Seston	919	96	2279	>99	3157	99	1118	99
Zooplankton	625	65	1287	56	2790	87	637	56
Detritus	295	31	993	43	367	11	482	43
Seston (ash-free)	429	-	900	-	1173	-	508	-
Total	956	-	2285	-	3192	-	1133	-

Appendix 217. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 6 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	26	6	0	0	-	-	-	-
Benthos	<1	<1	12	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	7	2	5	<1	-	-	-	-
Seston	390	92	5061	>99	-	-		-
Zooplankton	94	22	2143	42	-	-	-	-
Detritus	296	70	2918	57	-	-	-	-
Seston (ash-free)	175	-	1724	-	-	-	-	-
Total	423	-	5079	-	-	-	-	-

Appendix 218. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	10	1	0	0	1	<1
Benthos	13	1	103	15	1	<1	105	18
Mysis relicta	0	0	78	12	0	0	6	1
Larval fish	2	<1	1	<1	5	1	4	1
Seston	1649	99	566	83	782	99	482	81
Zooplankton	1511	91	286	42	766	**	354	60
Detritus	138	8	280	41	**	**	128	22
Seston (ash-free)	310	-	123	-	109	-	104	-
Total	1663	-	680	-	788	-	591	-

Appendix 219. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 6 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	5	<1	30	2	-	-	-	-
Mysis relicta	0	0	1	<1	-	-	-	-
Larval fish	4	<1	8	1	-	-	-	-
Seston	1946	>99	1305	97	-	-	-	-
Zooplankton	2043	**	431	32	-	-	-	-
Detritus	**	**	874	65	-	-	-	-
Seston (ash-free)	352	-	461	-	-	-	-	-
Total	1955	-	1343	-	-	-	-	-

Appendix 220. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	64	3	38	1	0	0
Benthos	7	1	309	15	3	<1	57	11
Mysis relicta	0	0	215	10	0	0	20	4
Larval fish	2	<1	9	<1	5	<1	6	1
Seston	1097	99	1701	82	5026	99	456	88
Zooplankton	917	83	580	28	1141	22	371	71
Detritus	180	16	1121	54	3885	77	85	16
Seston (ash-free)	280	-	419	-	1498	-	75	-
Total	1107	-	2082	-	5072	-	520	-

Appendix 221. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 6 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	49	1	-	-	-	-
Benthos	5	<1	165	5	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	6	<1	26	1	-	-	-	-
Seston	1718	99	3067	93	-	-	-	-
Zooplankton	763	44	825	**	-	-	-	-
Detritus	955	55	**	**	-	-	-	-
Seston (ash-free)	702	-	1570	-	-	-	-	-
Total	1730	-	3307	-	-	-	-	-

Appendix 222. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 7 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	2	<1	<1	<1	0	0
Benthos	0	0	258	16	6	<1	25	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	6	1	12	1	49	2	10	<1
Seston	762	99	1369	83	2938	98	2461	99
Zooplankton	640	83	794	48	3364	**	2034	81
Detritus	122	16	575	35	**	**	427	17
Seston (ash-free)	122	-	451	-	155	-	243	-
Total	768	-	1641	-	2993	-	2496	-

Appendix 223. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, *mysids, ichthyoplankton*, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 7 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	1	<1	75	24	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	5	<1	13	4	-	-	-	-
Seston	1007	99	224	72	-	-	-	-
Zooplankton	610	60	198	**	-	-	-	-
Detritus	397	39	**	**	-	-	-	-
Seston (ash-free)	351	-	73	-	-	-	-	-
Total	1012	-	312	-	-	-	-	-

Appendix 224. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	34	4
Benthos	<1	<1	340	31	2	<1	115	13
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	2	<1	2	<1	5	1
Seston	282	>99	769	69	850	>99	726	82
Zooplankton	99	35	160	14	382	45	525	60
Detritus	183	65	609	55	468	55	202	23
Seston (ash-free)	140	-	202	-	317	-	77	-
Total	282	-	1111	-	854	-	881	-

Appendix 225. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 7 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	161	37	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	1	<1	6	1	-	-	-	-
Seston	271	>99	273	62	-	-	-	-
Zooplankton	99	36	69	16	-	-	-	-
Detritus	172	63	204	46	-	-	-	-
Seston (ash-free)	109	-	52	-	-	-	-	-
Total	272	-	440	-	-	-	-	-

Appendix 226. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Lake Nicolet Summer - Station 8 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	2	1	56	42	4	2	1	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	4	1	1	<1	2	1	1	<1
Seston	288	98	76	58	232	98	205	99
Zooplankton	160	**	39	29	80	34	55	27
Detritus	**	**	38	29	152	64	150	73
Seston (ash-free)	79	-	15	-	63	-	46	-
Total	293	-	132	-	237	-	207	-

Appendix 227. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Lake Nicolet Summer - Station 8 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	5	1	0	0	0	0	0	0
Benthos	<1	<1	27	11	<1	<1	16	4
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	1	<1	1	<1	1	<1
Seston	829	99	218	89	396	>99	385	96
Zooplankton	32	4	15	6	208	52	73	18
Detritus	798	96	203	83	188	47	313	78
Seston (ash-free)	502	-	65	-	80	-	61	-
Total	835	-	246	-	397	-	403	-

Appendix 228. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Lake Nicolet Summer - Station 9 - Bottom - 355 μm							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	32	2	0	0	2	-	0	0
Benthos	5	<1	37	18	0	*	4	4
Mysis relicta	0	0	0	0	0	-	3	3
Larval fish	1	<1	0	0	0	-	0	0
Seston	1886	98	162	82	199	-	81	96
Zooplankton	192	10	20	10	45	-	10	11
Detritus	1695	88	143	72	154	-	71	84
Seston (ash-free)	1251	-	20	-	44	-	24	-
Total	1925	-	199	-	166	*	84	-

Appendix 229. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	2	<1	0	0	2	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	1661	100	2721	>99	2690	100	1451	>99
Zooplankton	1853	**	2497	92	1990	74	1058	73
Detritus	**	**	224	8	700	26	393	27
Seston (ash-free)	72	-	121	-	107	-	135	-
Total	1661	-	2723	-	2690	-	1453	-

Appendix 230. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

Parameter	Point aux Frenes Winter - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	3	<1	0	0	2	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	787	100	6148	>99	891	100	3950	>99
Zooplankton	420	53	6141	**	825	**	3740	**
Detritus	367	47	**	**	**	**	**	**
Seston (ash-free)	56	-	196	-	42	-	64	-
Total	787	-	6151	-	891	-	3952	-

Appendix 231. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	145	9	0	0	<1	<1
Benthos	80	35	10	1	0	0	3	<1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	148	65	1442	90	150	100	1060	>99
Zooplankton	139	61	1223	77	167	**	838	**
Detritus	9	4	218	14	**	**	**	**
Seston (ash-free)	10	-	33	-	8	-	26	-
Total	228	-	1597	-	150	-	1063	-

Appendix 232. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Winter - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	3	<1	0	0	3	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	3257	100	4178	>99	6899	100	548	99
Zooplankton	2388	73	3054	73	5179	75	485	88
Detritus	870	27	1124	27	1720	25	63	11
Seston (ash-free)	141	-	246	-	111	-	25	-
Total	3257	-	4181	-	6899	-	551	-

Appendix 233. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	11	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	205	>99	4172	>99	-	-	-	-
Zooplankton	1762	**	1009	24	-	-	-	-
Detritus	**	**	3163	76	-	-	-	-
Seston (ash-free)	44	-	130	-	-	-	-	-
Total	205	-	4182	-	-	-	-	-

Appendix 234. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	12	1	0	0	2	1
Benthos	4	2	16	2	0	0	4	1
Mysis relicta	0	0	12	1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	173	98	963	97	99	100	318	98
Zooplankton	112	63	911	92	80	81	319	**
Detritus	61	35	53	5	19	18	**	**
Seston (ash-free)	33	-	31	-	8	-	6	-
Total	178	-	992	-	99	-	325	-

Appendix 235. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	5	<1	-	-	-	-
Benthos	0	0	22	1	-	-	-	-
Mysis relicta	0	0	7	<1	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	43	100	2138	99	-	-	-	-
Zooplankton	794	**	749	35	-	-	-	-
Detritus	**	**	1390	64	-	-	-	-
Seston (ash-free)	15	-	139	-	-	-	-	-
Total	43	-	2165	-	-	-	-	-

Appendix 236. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Winter - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	0	0	<1	<1	0	0	33	1
Mysis relicta	0	0	0	0	0	0	33	1
Larval fish	0	0	0	0	0	0	0	0
Seston	1785	100	5634	>99	1679	100	3817	99
Zooplankton	1213	68	3742	66	1203	72	2756	72
Detritus	573	32	1892	34	475	28	1061	28
Seston (ash-free)	80	-	116	-	135	-	46	-
Total	1785	-	5635	-	1679	-	3850	-

Appendix 237. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Winter - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	0	0	2	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	396	100	2174	>99	-	-	-	-
Zooplankton	422	**	1824	84	-	-	-	-
Detritus	**	**	350	16	-	-	-	-
Seston (ash-free)	33	-	56	-	-	-	-	-
Total	396	-	2175	-	-	-	-	-

Appendix 238. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Winter - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	0	0
Benthos	<1	<1	16	<1	0	0	<1	<1
Mysis relicta	0	0	16	<1	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	4116	>99	4543	>99	4710	100	1790	>99
Zooplankton	3769	92	2484	54	3628	77	1520	85
Detritus	347	8	2060	45	1082	23	270	15
Seston (ash-free)	155	-	154	-	70	-	12	-
Total	4117	-	4560	-	4710	-	1790	-

Appendix 239. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Winter - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	-	-	-	-
Benthos	<1	<1	<1	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	5679	100	1323	>99	-	-	-	-
Zooplankton	4851	85	965	73	-	-	-	-
Detritus	828	15	358	27	-	-	-	-
Seston (ash-free)	215	-	21	-	-	-	-	-
Total	5679	-	1323	-	-	-	-	-

Appendix 240. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Winter - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	0	0	4	<1
Benthos	>1	<1	<1	<1	<1	<1	15	<1
Mysis relicta	0	0	0	0	0	0	4	<1
Larval fish	0	0	0	0	0	0	0	0
Seston	2695	>99	7049	>99	4595	>99	3680	>99
Zooplankton	1941	72	3839	54	3284	71	3007	81
Detritus	754	28	3211	46	1311	29	673	18
Seston (ash-free)	111	-	55	-	56	-	43	-
Total	2695	-	7051	-	4595	-	3699	-

Appendix 241. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Winter - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	1	<1	-	-	-	-
Benthos	1	<1	4	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	1226	>99	1532	>99	-	-	-	-
Zooplankton	1024	83	1188	77	-	-	-	-
Detritus	202	16	344	22	-	-	-	-
Seston (ash-free)	176	-	34	-	-	-	-	-
Total	1227	-	1537	-	-	-	-	-

Appendix 242. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 1 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	9	3	8	<1	0	0	15	1
Benthos	2	1	473	17	60	5	203	7
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	310	96	2249	82	1069	95	2631	92
Zooplankton	6	2	372	14	6	1	287	10
Detritus	304	95	1877	69	1063	94	2344	82
Seston (ash-free)	86	-	523	-	343	-	888	-
Total	321	-	2730	-	1129	-	2849	-

Appendix 243. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 2 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	12	13	0	0	1	1	0	0
Benthos	<1	<1	50	3	<1	<1	91	6
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	80	87	1108	71	183	99	1541	94
Zooplankton	<1	1	126	8	16	8	249	15
Detritus	79	86	983	63	167	90	1292	79
Seston (ash-free)	40	-	415	-	115	-	190	-
Total	91	-	1158	-	185	-	1632	-

Appendix 244. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 2 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	5	3	4	<1
Benthos	15	7	108	9	<1	<1	117	8
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	185	93	1100	91	143	96	1347	92
Zooplankton	56	28	165	14	21	14	157	11
Detritus	130	65	935	77	123	83	1190	81
Seston (ash-free)	28	-	239	-	62	-	148	-
Total	200	-	1208	-	149	-	1467	-

Appendix 245. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 3 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	22	3	0	0	0	0	0	0
Benthos	2	<1	21	4	0	0	43	15
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	204	32	449	96	38	100	238	85
Zooplankton	29	4	15	3	2	4	24	9
Detritus	176	27	435	93	36	96	214	76
Seston (ash-free)	43	-	307	-	9	-	100	-
Total	228	-	470	-	39	-	282	-

Appendix 246. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 3 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	13	2	71	2	-	-	-	-
Benthos	15	2	49	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	<1	<1	-	-	-	-
Seston	782	97	3932	97	-	-	-	-
Zooplankton	276	34	1910	47	-	-	-	-
Detritus	506	63	2023	50	-	-	-	-
Seston (ash-free)	237	-	2173	-	-	-	-	-
Total	810	-	4054	-	-	-	-	-

Appendix 247. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Point aux Frenes Summer - Station 3 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	32	-	91	10	0	-	0	0
Benthos	2	-	57	6	2	*	75	18
Mysis relicta	0	-	0	0	0	-	0	0
Larval fish	0	-	<1	<1	0	-	0	0
Seston	149	*	780	84	170	-	337	82
Zooplankton	14	-	114	12	6	-	40	10
Detritus	132	*	666	72	164	-	297	72
Seston (ash-free)	41	-	259	-	11	-	130	-
Total	151	*	929	-	53	*	412	-

Appendix 248. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Summer - Station 3 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	4	5	20	1	-	-	-	-
Benthos	3	4	70	3	-	-	-	-
<u>Mysis relicta</u>	0	0	0	0	-	-	-	-
Larval fish	0	0	<1	<1	-	-	-	-
Seston	76	91	2628	97	-	-	-	-
Zooplankton	17	20	1586	58	-	-	-	-
Detritus	59	71	1042	38	-	-	-	-
Seston (ash-free)	47	-	829	-	-	-	-	-
Total	83	-	2718	-	-	-	-	-

Appendix 249. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 4 - Surface - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	80	33	8	5	10	6	0	0
Benthos	<1	<1	0	0	0	0	9	4
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	1	<1	<1	<1	<1	<1	<1	<1
Seston	162	67	157	95	153	94	213	96
Zooplankton	20	8	14	9	27	16	52	23
Detritus	142	59	143	87	126	78	161	73
Seston (ash-free)	48	-	103	-	29	-	43	-
Total	243	-	164	-	163	-	221	-

Appendix 250. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Double asterisk (**) indicates one or both replicate detrital biomass measurements had a negative value(s). In these cases, percentages of total biomass were not calculated.

	Point aux Frenes Summer - Station 4 - Surface - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	19	<1	12	3	-	-	-	-
Benthos	3	<1	6	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	<1	<1	<1	<1	-	-	-	-
Seston	3862	99	417	96	-	-	-	-
Zooplankton	780	20	435	**	-	-	-	-
Detritus	3083	79	**	**	-	-	-	-
Seston (ash-free)	365	-	35	-	-	-	-	-
Total	3884	-	436	-	-	-	-	-

Appendix 251. Average biomass [$\bar{X}$, dry weight ($mg/1000\ m^3$)] for macrophytes, benthos, *mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight* seston ($mg/1000\ m^3$) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2). Single asterisk (*) indicates one of two replicates not processed for biomass components marked with the asterisk. In these cases, percentage of total biomass was not calculated for any biomass components.

	Point aux Frenes Summer - Station 4 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	0	0	11	-	0	0
Benthos	1	1	3	3	0	*	31	12
<u>Mysis relicta</u>	0	0	0	0	0	-	0	0
Larval fish	<1	<1	<1	<1	<1	-	<1	<1
Seston	197	99	92	96	282	-	232	88
Zooplankton	21	10	13	14	66	-	11	4
Detritus	176	89	79	83	217	-	221	84
Seston (ash-free)	41	-	17	-	65	-	101	-
Total	198	-	96	-	261	*	263	-

Appendix 252. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Summer - Station 4 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	9	1	0	0	-	-	-	-
Benthos	11	1	5	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	1	<1	1	<1	-	-	-	-
Seston	1300	98	428	99	-	-	-	-
Zooplankton	894	68	366	84	-	-	-	-
Detritus	406	31	62	14	-	-	-	-
Seston (ash-free)	316	-	44	-	-	-	-	-
Total	1322	-	434	-	-	-	-	-

Appendix 253. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 4 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	27	6	2	1	29	9	0	0
Benthos	2	<1	17	7	1	<1	167	42
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	<1	<1	0	0	1	<1
Seston	422	94	217	92	279	90	230	58
Zooplankton	19	4	21	9	41	13	20	5
Detritus	403	89	196	83	238	77	211	53
Seston (ash-free)	96	-	57	-	47	-	96	-
Total	451	-	236	-	308	-	399	-

Appendix 254. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Summer - Station 4 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	31	2	0	0	-	-	-	-
Benthos	10	<1	36	6	-	-	-	-
Mysis relicta	0	0	5	1	-	-	-	-
Larval fish	<1	<1	3	<1	-	-	-	-
Seston	1913	98	583	94	-	-	-	-
Zooplankton	1350	69	501	80	-	-	-	-
Detritus	564	29	82	13	-	-	-	-
Seston (ash-free)	627	-	77	-	-	-	-	-
Total	1954	-	622	-	-	-	-	-

Appendix 255. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 5 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	16	<1	31	2	60	1	20	2
Benthos	3	<1	12	1	7	<1	121	12
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	1	<1
Seston	4647	>99	1632	97	9142	99	840	86
Zooplankton	35	1	4	<1	2	<1	1	<1
Detritus	4612	99	1628	97	9140	99	839	86
Seston (ash-free)	969	-	332	-	2689	-	412	-
Total	4666	-	1675	-	9210	-	983	-

Appendix 256. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 5 - Mid-depth - 153 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	408	<1	13	<1	-	-	-	-
Benthos	6	<1	14	<1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	<1	<1	0	0	-	-	-	-
Seston	151040	>99	15082	>99	-	-	-	-
Zooplankton	12	<1	41	<1	-	-	-	-
Detritus	151030	>99	15042	>99	-	-	-	-
Seston (ash-free)	8906	-	6464	-	-	-	-	-
Total	151450	-	15110	-	-	-	-	-

Appendix 257. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 5 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	19	<1	108	8	29	1	95	8
Benthos	4	<1	6	<1	2	<1	30	2
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	7206	>99	1308	92	5595	99	1140	90
Zooplankton	8	<1	2	<1	0	0	2	<1
Detritus	7199	>99	1307	92	5595	99	1138	90
Seston (ash-free)	1546	-	404	-	1966	-	673	-
Total	7229	-	1422	-	5625	-	1265	-

Appendix 258. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

Parameter	Point aux Frenes Summer - Station 5 - Bottom - 153 um							
	Day 1		Night 1		Day 2		Night 2	
	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	6	<1	-	-	-	-
Benthos	1	<1	170	1	-	-	-	-
Mysis relicta	0	0	0	0	-	-	-	-
Larval fish	0	0	0	0	-	-	-	-
Seston	332180	100	12530	99	-	-	-	-
Zooplankton	9	<1	19	<1	-	-	-	-
Detritus	332170	>99	12512	99	-	-	-	-
Seston (ash-free)	11403	-	6981	-	-	-	-	-
Total	332180	-	12706	-	-	-	-	-

Appendix 259. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 6 - Mid-depth - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	0	0	44	<1	10	<1	29	1
Benthos	1	<1	59	1	3	<1	594	12
<u>Mysis relicta</u>	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	6913	>99	10389	99	4285	>99	4202	87
Zooplankton	3	<1	3	<1	1	<1	1	<1
Detritus	6910	99	10386	99	4284	99	4201	87
Seston (ash-free)	1140	-	2409	-	892	-	1255	-
Total	6915	-	10491	-	4298	-	4825	-

Appendix 260. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 6 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	4	<1	10	<1	180	7	43	1
Benthos	<1	<1	243	1	<1	<1	273	4
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	0	0	0	0	0	0	0	0
Seston	1525	>99	19369	99	2539	93	7320	96
Zooplankton	<1	<1	<1	<1	<1	<1	2	<1
Detritus	1525	99	19369	99	2539	93	7318	96
Seston (ash-free)	217	-	3082	-	378	-	1275	-
Total	1530	-	19623	-	2719	-	7635	-

Appendix 261. Average biomass [$\bar{X}$, dry weight (mg/1000 m^3)] for macrophytes, benthos, mysids, ichthyoplankton, and seston (zooplankton and detritus) and for ash-free dry weight seston (mg/1000 m^3) and respective percentages of total biomass (%T) in drift samples collected in the St. Marys River, 1985 (n = 2).

	Point aux Frenes Summer - Station 7 - Bottom - 355 um							
	Day 1		Night 1		Day 2		Night 2	
Parameter	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T	$\bar{X}$	%T
Macrophytes	66	1	254	<1	61	<1	280	1
Benthos	76	1	669	<1	58	<1	205	1
Mysis relicta	0	0	0	0	0	0	0	0
Larval fish	<1	<1	1	<1	0	0	0	0
Seston	10551	99	316510	>99	141070	>99	25279	98
Zooplankton	<1	<1	4	<1	2	<1	1	<1
Detritus	10551	99	316500	>99	141070	>99	25278	98
Seston (ash-free)	4911	-	17900	-	8937	-	3893	-
Total	10693	-	317430	-	141190	-	25764	-

Appendix 262. Light measurements taken in Izaak Walton Bay. Light energy flux is in units of microeinsteins m^{-2} s^{-1}. Light extinction coefficients calculated from the light measurements are also given. Light measurements were taken at each location on 5 days at three sites over submerged plant beds. Although measurements were taken in the same general area on all five occasions, the three sites sampled on any given day are not necessarily the same locations as the sampling sites of the other 4 days.

Site 1		Site 2		Site 3	
1. July 11, 1985					
Depth (m)	energy flux (μE m^{-2} s^{-1})	Depth (m)	energy flux (μE m^{-2} s^{-1})	Depth (m)	energy flux (μE m^{-2} s^{-1})
0	1516	0	1676	0	1716
1.0	971	1.0	958	1.0	1117
2.0	605	2.0	718	2.0	692
2.9	496	2.5	585	2.5	612
light extinction coefficients (η/m)					
0.414		0.434		0.429	
2. August 9, 1985					
Depth (m)	energy flux (μE m^{-2} s^{-1})	Depth (m)	energy flux (μE m^{-2} s^{-1})	Depth (m)	energy flux (μE m^{-2} s^{-1})
0	1756	0	1716	0	1317
1.0	1037	1.0	944	1.0	1037
2.0	665	2.0	745	2.0	732
2.2	638	2.5	559	2.6	559
light extinction coefficients (η/m)					
0.477		0.451		0.310	

Appendix 262. Continued.

Site 1		Site 2		Site 3	
3. August 11, 1985					
Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1636	0	1636	0	1756
1.0	1037	1.0	1157	1.0	1237
2.0	705	2.0	798	2.0	891
2.5	612	3.0	625	2.9	705
		3.5	545		
light extinction coefficients (η/m)					
0.409		0.324		0.325	
4. August 12, 1985					
Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)
0	545	0	865	0	785
1.0	343	1.0	585	1.0	505
2.0	287	2.0	386	2.0	375
3.0	203	3.0	283	2.95	275
light extinction coefficients (η/m)					
0.329		0.378		0.366	

Appendix 262. Continued.

Site 1		Site 2		Site 3	
5. August 13, 1985					
Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	energy flux ($\mu E\ m^{-2}\ s^{-1}$)
0	203	0	439	0	1317
1.0	148	1.0	311	1.0	851
2.0	92	2.0	188	2.0	559
3.0	61	3.0	132	3.0	347
3.5	48	3.8	108	3.5	303
light extinction coefficients (η/m)					
0.402		0.386		0.430	

Izaak Waiton Bay light extinction coefficients, mean value: 0.391 η/m

95% confidence interval: 0.363 to 0.419 η/m

Appendix 263. Light measurements taken in Lake Nicolet. Walton Bay. Light energy flux is in units of microeinsteins m^{-2} s^{-1}. Light extinction coefficients calculated from the light measurements are also given. Light measurements were taken at each location on 5 days at three sites over submerged plant beds. Although measurements were taken in the same general area on all five occasions, the three sites sampled on any given day are not necessarily the same locations as the sampling sites of the other 4 days.

Site 1		Site 2		Site 3	
1. July 11, 1985					
Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})
0	1756	0	1676	0	1636
1.0	998	1.0	1077	1.0	971
2.0	678	2.0	705	2.0	585
3.0	439	3.0	452	3.0	386
3.5	359	3.8	346	4.0	283
light extinction coefficients (η/m)					
0.464		0.425		0.464	

Appendix 263. Continued.

Site 1		Site 2		Site 3	
2. August 1, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1875	0	1476	0	1397
1.0	1237	1.0	825	1.0	479
2.0	758	2.0	545	2.0	279
3.0	559	3.0	339	3.0	176
4.0	347	4.0	227	4.0	110
5.0	251	5.0	152	5.0	72
6.0	164	6.0	90	6.0	49
		6.5	67	7.0	31
				8.0	21
light extinction coefficients (η/m)					
0.410		0.471		0.568	

Appendix 263. Continued.

Site 1		Site 2		Site 3	
3. August 9, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	931	0	545	0	931
1.0	519	1.0	545	1.0	572
2.0	339	2.0	188	2.0	371
3.0	207	3.0	128	3.0	231
4.0	140	4.0	84	4.0	152
5.0	96	5.0	55	5.0	97
5.75	69	6.0	37	5.75	76
light extinction coefficients (η/m)					
0.466		0.463		0.448	
4. August 11, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1397	0	1317	0	1157
1.0	758	1.0	745	1.0	678
2.0	479	2.0	452	2.0	439
3.0	295	3.0	283	3.0	267
4.0	207	4.0	184	4.0	164
5.0	132	5.0	124	5.0	110
5.9	85			5.75	82
light extinction coefficients (η/m)					
0.482		0.491		0.473	

Appendix 263. Continued.

Site 1		Site 2		Site 3	
5. August 12, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	319	0	323	0	426
1.0	180	1.0	227	1.0	303
2.0	124	2.0	172	2.0	215
3.0	96	3.0	116	3.0	152
4.0	68	4.0	84	4.0	102
5.0	48	5.0	57	5.0	73
6.0	34	5.75	45	6.0	49
7.0	24			7.0	31
light extinction coefficients (η/m)					
0.380		0.342		0.362	

Lake Nicolet light extinction coefficients, mean value: 0.447 η/m

95% confidence interval: 0.416 to 0.479 η/m

Appendix 264. Light measurements taken in western Lake Munuscong. Light energy flux is in units of microeinsteins m^{-2} s^{-1}. Light extinction coefficients calculated from the light measurements are also given. Light measurements were taken at each location on 5 days at three sites over submerged plant beds. Although measurements were taken in the same general area on all five occasions, the three sites sampled on any given day are not necessarily the same locations as the sampling sites of the other 4 days.

Site 1		Site 2		Site 3	
1. July 5, 1985					
Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})
0	1037	0	891	0	771
1.0	572	1.0	492	1.0	219
2.0	287	2.0	271	2.0	74
2.5	259	2.7	184		
light extinction coefficients (η/m)					
0.590		0.589		1.189	
2. July 30, 1985					
Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})
0	1077	0	1237	0	1277
1.0	638	1.0	439	1.0	363
2.0	267	2.0	255	2.0	211
3.0	120	3.0	112	3.0	104
4.0	61	4.0	45	4.0	47
light extinction coefficients (η/m)					
0.713		0.822		0.853	

Appendix 264. Continued.

Site 1		Site 2		Site 3	
3. August 9, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	771	0	1636	0	1476
1.0	412	1.0	865	1.0	825
2.0	223	2.0	466	2.0	386
3.0	128	3.0	215	3.0	203
4.0	69	4.0	109	4.0	110
4.75	44				
light extinction coefficients (η/m)					
0.604		0.669		0.653	
4. August 12, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	426	0	479	0	439
1.0	227	1.0	227	1.0	211
2.0	128	2.0	108	2.0	116
3.0	85	3.0	59	3.0	64
4.0	53	4.0	31	3.75	44
4.4	45	4.5	26		
light extinction coefficients (η/m)					
0.529		0.678		0.634	

Appendix 264. Continued.

Site 1		Site 2		Site 3	
5. August 13, 1985					
0	1636	0	1716	0	1835
1.0	745	1.0	426	1.0	958
2.0	271	2.0	78	2.0	412
3.0	108	3.0	22	3.0	180
4.0	43	3.8	10	4.0	49
light extinction coefficients (η/m)					
0.903		1.413		0.836	

Western Lake Munuscong light extinction coefficients, mean value:

0.778 η/m

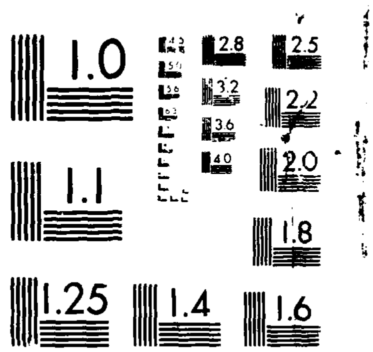
95% confidence interval: 0.644 to 0.913 η/m

Appendix 265. Light measurements taken in eastern Lake Munuscong. Light energy flux is in units of microeinsteins m^{-2} s^{-1}. Light extinction coefficients calculated from the light measurements are also given. Light measurements were taken at each location on 5 days at three sites over submerged plant beds. Although measurements were taken in the same general area on all five occasions, the three sites sampled on any given day are not necessarily the same locations as the sampling sites of the other 4 days.

Site 1		Site 2		Site 3	
1. July 11, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1317	0	1277	0	1317
1.0	572	1.0	572	1.0	532
2.0	271	2.0	271	2.0	247
3.0	148	3.0	140	3.0	132
4.0	76	4.0	77	4.0	65
4.5	53	4.75	48	4.5	47
light extinction coefficients (η/m)					
0.725		0.711		0.760	
2. July 23, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1100	0	1317	0	906
1.0	492	1.0	545	1.0	479
2.0	231	2.0	303	2.0	251
3.0	108	3.0	172	3.0	152
3.7	50	3.75	51	3.5	122

AD-A195 491   DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND   6/7
DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR
GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86
UNCLASSIFIED DACW35-85-C-0005   F/G 8/1   NL

cont



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

Appendix 265. Continued.

Site 1		Site 2		Site 3	
light extinction coefficients (η/m)					
0.906		0.992		0.593	
3. August 9, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1476	0	1210	0	1077
1.0	771	1.0	505	1.0	452
2.0	343	2.0	247	2.0	200
3.0	164	3.0	132	3.0	105
3.5	118	3.5	97	3.5	88
light extinction coefficients (η/m)					
0.724		0.744		0.761	
4. August 12, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	227	0	207	0	188
1.0	96	1.0	92	1.0	84
2.0	53	2.0	47	2.0	37
3.0	25	3.0	25	3.0	21
4.0	14	4.0	15	3.5	19
light extinction coefficients (η/m)					
0.718		0.687		0.711	

Appendix 265. Continued.

Site 1		Site 2		Site 3	
5. August 13, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1676	0	2075	0	1796
1.0	1024	1.0	1037	1.0	756
2.0	505	2.0	505	2.0	343
3.0	263	3.0	263	3.0	152
4.0	140	4.0	132	4.0	72
4.5	96	4.1	112	4.75	51
light extinction coefficients (η/m)					
0.622		0.699		0.787	

Eastern Lake Munuscong light extinction coefficients, mean value:

0.743 η/m

95% confidence interval: 0.688 to 0.797 η/m

Appendix 266. Light measurements taken in Raber Bay. Light energy flux is in units of microeinsteins m^{-2} s^{-1}. Light extinction coefficients calculated from the light measurements are also given. Light measurements were taken at each location on 5 days at three sites over submerged plant beds. Although measurements were taken in the same general area on all five occasions, the three sites sampled on any given day are not necessarily the same locations as the sampling sites of the other 4 days.

Site 1		Site 2		Site 3	
1. July 5, 1985					
Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})
0	1636	0	1596	0	1796
1.0	971	1.0	705	1.0	851
1.9	333	2.0	412	2.0	386
		2.5	359		
light extinction coefficients (η/m)					
0.769		0.645		0.764	
2. July 23, 1985					
Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})	Depth (m)	Energy Flux (μE m^{-2} s^{-1})
0	1317	0	2234	0	1955
1.0	785	1.0	1197	1.0	811
2.0	319	2.0	665	2.0	323
3.0	275	3.0	363	3.0	188
3.75	223	3.25	327	3.3	144
light extinction coefficients (η/m)					
0.524		0.493		0.808	

Appendix 266. Continued.

Site 1		Site 2		Site 3	
3. August 9, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	492	0	891	0	1184
1.0	227	1.0	466	1.0	585
2.0	120	2.0	207	2.0	271
3.0	63	3.0	96	3.0	132
4.0	33	3.5	67	3.75	78
4.25	28				
light extinction coefficients (η/m)					
0.681		0.736		0.728	
4. August 12, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	140	0	116	0	77
1.0	45	1.0	29	1.0	22
2.0	21	2.0	12	2.0	9
3.0	10	3.0	6	3.0	4
light extinction coefficients (η/m)					
0.918		1.058		1.030	

Appendix 266. Continued.

Site 1		Site 2		Site 3	
5. August 13, 1985					
Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)	Depth (m)	Energy Flux ($\mu E\ m^{-2}\ s^{-1}$)
0	1676	0	1170	0	1317
1.0	851	1.0	678	1.0	582
2.0	452	2.0	307	2.0	223
3.0	203	3.0	144	3.0	89
4.0	97	3.5	96	3.5	60
4.8	49				
light extinction coefficients (η/m)					
0.716		0.696		0.886	

Raber Bay light extinction coefficients, mean value: 0.763 η/m

95% confidence interval: 0.675 to 0.852 η/m

Appendix 267. Zooplankton abundance (no./m^3), composition, and statistics for various dates, stations, mesh sizes, and sampling periods on the St. Marys River, 1985. D1D = day 1, day; D2D = day 2, day; D1N = day 1, night; D2N = day 2, night. FP = Frechette Point, LN = Lake Nicolet, and LN = Point au Frenes.

Station: FP3-1 | Date collected: 23 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 27 MAR 85
Sample time: 1124 | Vol filtered (m3): 208.4 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	4	5	5.53	0.9	16	2.62
Diaptomus sicilis C6	159	162	197.16	2.6	1	93.59
Limnocalanus C6	5	7	7.37	1.7	24	3.50
Bosmina	0	1	0.61	0.9	141	0.29
MEAN AND STATISTICS BASED ON A AND B COUNTS	168	175	210.67	6.1	3	100.00

Station: FP3-2 | Date collected: 23 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 27 MAR 85
Sample time: 1124 | Vol filtered (m3): 208.4 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	125	130	313.24	8.7	3	94.44
Limnocalanus C6	6	9	18.43	5.2	28	5.56
MEAN AND STATISTICS BASED ON A AND B COUNTS	131	139	331.67	13.9	4	100.00

Station: FP3-1 | Date collected: 23 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 29 MAR 85
Sample time: 1126 | Vol filtered (m3): 107.0 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: #10 | Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	28	39	160.30	37.2	23	15.47
Diaptomus C1-C5	15	12	64.60	10.2	16	6.24
Diaptomus sicilis C6	171	160	791.93	37.2	5	76.44
Limnocalanus C6	3	2	11.96	3.4	28	1.15
Canthocamptus C6	0	3	7.18	10.2	141	0.69
MEAN AND STATISTICS BASED ON A AND B COUNTS	217	216	1035.96	3.4	0	100.00

Appendix 267. Cont.

Station: FP3-2 Date collected: 23 FEB 85

Sample period: D1D
Sample time: 1126
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 107.0
Mesh size: #10

Date examined: 29 MAR 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	28	20	114.84	27.1	24	13.30
Diaptomus C1-C5	29	18	112.45	37.2	33	13.02
Diaptomus sicilis C6	117	138	610.09	71.1	12	70.64
Limnocalanus C6	5	4	21.53	3.4	16	2.49
Canthocamptus C6	1	0	2.39	3.4	141	0.28
Chydorus	1	0	2.39	3.4	141	0.28
MEAN AND STATISTICS BASED ON A AND B COUNTS	181	180	863.70	3.4	0	100.00

Station: FP3-1 Date collected: 23 FEB 85

Sample period: D1D
Sample time: 1124
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 189.8
Mesh size: # 2

Date examined: 28 MAR 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	1	1	1.35	0.0	0	0.82
Diaptomus sicilis C6	123	110	157.13	12.4	8	95.49
Limnocalanus C6	5	4	6.07	1.0	16	3.69
MEAN AND STATISTICS BASED ON A AND B COUNTS	129	115	164.55	13.4	8	100.00

Station: FP3-2 Date collected: 23 FEB 85

Sample period: D1D
Sample time: 1124
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 189.8
Mesh size: # 2

Date examined: 28 MAR 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	0	1	0.67	1.0	141	0.41
Diaptomus C1-C5	2	1	2.02	1.0	47	1.22
Diaptomus sicilis C6	111	100	142.30	10.5	7	86.12
Limnocalanus C6	12	16	20.23	5.7	28	12.24
MEAN AND STATISTICS BASED ON A AND B COUNTS	125	120	165.23	4.8	3	100.00

Appendix 267. Cont.

Station: FP3-1 Date collected: 23 FEB 85

Sample period: D1D Station depth (m): 3.0 Date examined: 28 MAR 85
Sample time: 1126 Vol filtered (m3): 90.5 Enumerator: MO
Sample depth (m): 3.0 Mesh size: #10 Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	52	43	134.36	18.0	13	22.04
Diaptomus C1-C5	35	25	84.86	20.0	24	13.92
Diaptomus sicilis C6	149	122	383.29	54.0	14	62.88
Limnocalanus C6	1	1	2.83	0.0	0	0.46
Canthocamptus C6	2	0	2.83	4.0	141	0.46
Chydorus	1	0	1.41	2.0	141	0.23
MEAN AND STATISTICS BASED ON A AND B COUNTS	240	191	609.59	98.0	16	100.00

Station: FP3-2 Date collected: 23 FEB 85

Sample period: D1D Station depth (m): 3.0 Date examined: 28 MAR 85
Sample time: 1126 Vol filtered (m3): 90.5 Enumerator: MO
Sample depth (m): 3.0 Mesh size: #10 Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	16	21	104.66	20.0	19	14.62
Diaptomus C1-C5	5	7	33.94	8.0	24	4.74
Diaptomus sicilis C6	104	89	545.94	60.0	11	76.28
Limnocalanus C6	2	4	16.97	8.0	47	2.37
Canthocamptus C6	0	1	2.83	4.0	141	0.40
Bosmina	2	0	5.66	8.0	141	0.79
Chydorus	0	2	5.66	8.0	141	0.79
MEAN AND STATISTICS BASED ON A AND B COUNTS	129	124	715.67	20.0	3	100.00

Station: FP3-1 Date collected: 23 FEB 85

Sample period: D1N Station depth (m): 3.0 Date examined: 24 APR 85
Sample time: 1950 Vol filtered (m3): 170.3 Enumerator: MO
Sample depth (m): 1.5 Mesh size: # 2 Common split factor: 256

TAXON NAMI	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	3	2	3.76	1.1	28	1.80
Diaptomus sicilis C6	151	102	190.16	52.1	27	91.01
Limnocalanus C6	9	8	12.78	1.1	8	6.12
Canthocamptus C6	1	0	0.75	1.1	141	0.36
Senecella calanoides C6	1	1	1.50	0.0	0	0.72
MEAN AND STATISTICS BASED ON A AND B COUNTS	165	113	208.95	55.3	26	100.00

Appendix 267. Cont.

Station: FP3-2 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 24 APR 85
Sample time: 1950 | Vol filtered (m3): 170.3 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	2	2	6.01	0.0	0	1.47
Diaptomus sicilis C6	133	116	374.30	36.1	10	91.21
Limnocalanus C6	15	5	30.06	21.3	71	7.33
MEAN AND STATISTICS BASED ON A AND B COUNTS	150	123	410.38	57.4	14	100.00

Station: FP3-1 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 23 APR 85
Sample time: 1951 | Vol filtered (m3): 170.3 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: #10 | Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	30	35	48.85	5.3	11	14.71
Diaptomus C1-C5	15	22	27.81	7.4	27	8.37
Diaptomus sicilis C6	162	172	251.04	10.6	4	75.57
Limnocalanus C6	2	0	1.50	2.1	141	0.45
Canthocamptus C6	2	0	1.50	2.1	141	0.45
Asplanchna	1	1	1.50	0.0	0	0.45
MEAN AND STATISTICS BASED ON A AND B COUNTS	212	230	332.21	19.1	6	100.00

Station: FP3-2 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 23 MAR 85
Sample time: 1951 | Vol filtered (m3): 170.3 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: #10 | Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	4	3	10.52	2.1	20	1.83
Cyclops C1-C5	25	30	82.68	10.6	13	14.36
Diaptomus C1-C5	10	15	37.58	10.6	28	6.53
Diaptomus sicilis C6	150	140	435.94	21.3	5	75.72
Limnocalanus C6	2	3	7.52	2.1	28	1.31
Canthocamptus C6	1	0	1.50	2.1	141	0.26
MEAN AND STATISTICS BASED ON A AND B COUNTS	192	191	575.74	2.1	0	100.00

Appendix 267. Cont.

Station: FP3-1 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 23 APR 85
Sample time: 1951 | Vol filtered (m3): 156.0 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	0	1	0.41	0.6	141	0.37
Diaptomus sicilis C6	130	126	105.03	2.3	2	95.52
Limnocalanus C6	2	7	3.69	2.9	79	3.36
Chydorus	0	1	0.41	0.6	141	0.37
Daphnia	1	0	0.41	0.6	141	0.37
MEAN AND STATISTICS BASED ON A AND B COUNTS	133	135	109.95	1.2	1	100.00

Station: FP3-2 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 23 APR 85
Sample time: 1951 | Vol filtered (m3): 156.0 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	0	1	0.41	0.6	141	0.20
Diaptomus C1-C5	2	2	1.64	0.0	0	0.78
Diaptomus sicilis C6	226	262	200.21	20.9	10	95.50
Limnocalanus C6	9	9	7.38	0.0	0	3.52
MEAN AND STATISTICS BASED ON A AND B COUNTS	237	274	209.64	21.5	10	100.00

Station: FP3-1 | Date collected: 23 FEB 85

Sample period: D1N | Station depth (m): 3.0 | Date examined: 24 APR 85
Sample time: 1951 | Vol filtered (m3): 156.0 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: #10 | Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	26	18	36.10	9.3	26	9.71
Diaptomus C1-C5	11	21	26.26	11.6	44	7.06
Diaptomus sicilis C6	196	175	304.41	24.4	8	81.90
Limnocalanus C6	1	2	2.46	1.2	47	0.66
Canthocamptus C1-C5	1	1	1.64	0.0	0	0.44
Canthocamptus C6	1	0	0.82	1.2	141	0.22
MEAN AND STATISTICS BASED ON A AND B COUNTS	236	217	371.69	22.0	6	100.00

Appendix 267. Cont.

Station: FP3-2 | Date collected: 23 FEB 85

Sample period: D1N
Sample time: 1951
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 156.0
Mesh size: #10

Date examined: 24 APR 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	32	27	48.41	5.8	12	13.26
Diaptomus C1-C5	15	12	22.15	3.5	16	6.07
Diaptomus sicilis C6	156	191	284.72	40.6	14	77.98
Limnocalanus C6	4	6	8.21	2.3	28	2.25
Canthocamptus C6	1	0	0.82	1.2	141	0.22
Eucyclops agilis C6	0	1	0.82	1.2	141	0.22
MEAN AND STATISTICS BASED ON A AND B COUNTS	208	237	365.13	33.7	9	100.00

Station: LN3-1 | Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1205
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 114.3
Mesh size: # 2

Date examined: 14 MAY 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	140	140	627.12	0.0	0	93.65
Limnocalanus C6	8	11	42.55	9.5	22	6.35
MEAN AND STATISTICS BASED ON A AND B COUNTS	148	151	669.68	9.5	1	100.00

Station: LN3-2 | Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1205
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 114.3
Mesh size: # 2

Date examined: 14 MAY 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops vernalis C6	0	1	1.12	1.6	141	0.27
Diaptomus sicilis C6	163	206	413.23	68.1	16	97.88
Limnocalanus C6	4	3	7.84	1.6	20	1.86
MEAN AND STATISTICS BASED ON A AND B COUNTS	167	210	422.19	68.1	16	100.00

Appendix 267. Cont.

Station: LN3-1

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1204
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 115.4
Mesh size: #10

Date examined: 15 MAY 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	18	12	66.55	18.8	28	6.19
Diaptomus C1-C5	12	8	44.37	12.5	28	4.12
Diaptomus sicilis C6	231	200	956.12	97.3	10	88.87
Limnocalanus C6	2	2	8.87	0.0	0	0.82
MEAN AND STATISTICS BASED ON A AND B COUNTS	263	222	1075.91	128.6	12	100.00

Station: LN3-2

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1204
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 115.4
Mesh size: #10

Date examined: 15 MAY 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	205	259	1029.32	169.4	16	98.72
Limnocalanus C6	3	3	13.31	0.0	0	1.28
MEAN AND STATISTICS BASED ON A AND B COUNTS	208	262	1042.63	169.4	16	100.00

Station: LN3-1

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1205
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 98.9
Mesh size: # 2

Date examined: 14 MAY 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	243	235	618.65	14.6	2	98.56
Limnocalanus C6	5	2	9.06	5.5	61	1.44
MEAN AND STATISTICS BASED ON A AND B COUNTS	248	237	627.70	20.1	3	100.00

Appendix 267. Cont.

Station: LN3-2

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1205
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 98.9
Mesh size: # 2

Date examined: 14 MAY 85
Enumerator: MO
Common split factor: 256

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	161	150	402.51	20.1	5	97.49
Limnocalanus C6	5	·3	10.35	3.7	35	2.51
MEAN AND STATISTICS BASED ON A AND B COUNTS	166	153	412.86	23.8	6	100.00

Station: LN3-1

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1204
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 99.8
Mesh size: #10

Date examined: 15 MAY 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	20	17	94.91	10.9	11	13.45
Diaptomus C1-C5	18	15	84.65	10.9	13	12.00
Diaptomus sicilis C6	125	77	518.16	174.1	34	73.45
Limnocalanus C6	2	1	7.70	3.6	47	1.09
MEAN AND STATISTICS BASED ON A AND B COUNTS	165	110	705.41	199.5	28	100.00

Station: LN3-2

Date collected: 3 MAR 85

Sample period: D1D
Sample time: 1204
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 99.8
Mesh size: #10

Date examined: 15 MAY 85
Enumerator: MO
Common split factor: 512

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	10	12	56.43	7.3	13	6.25
Diaptomus C1-C5	15	11	66.69	14.5	22	7.39
Diaptomus sicilis C6	160	140	769.54	72.6	9	85.23
Limnocalanus C6	2	2	10.26	0.0	0	1.14
MEAN AND STATISTICS BASED ON A AND B COUNTS	187	165	902.93	79.8	9	100.00

Appendix 267. Cont.

Station: LM3-1 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 10 JUN 85
Sample time: 0802 | Vol filtered (m3): 50.2 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus sicilis C6	190	175	232.67	13.5	6	97.86
Limnocalanus C6	4	4	5.10	0.0	0	2.14
MEAN AND STATISTICS BASED ON A AND B COUNTS	194	179	237.77	13.5	6	100.00

Station: LM3-2 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 11 JUN 85
Sample time: 0802 | Vol filtered (m3): 50.2 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	1	2	1.91	0.9	47	1.07
Diaptomus sicilis C6	144	116	165.74	25.2	15	92.53
Limnocalanus C6	5	13	11.47	7.2	63	6.41
MEAN AND STATISTICS BASED ON A AND B COUNTS	150	131	179.12	17.1	10	100.00

Station: LM3-1 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 18 JUN 85
Sample time: 0815 | Vol filtered (m3): 49.5 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: #10 | Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	2	3	0.10	0.0	28	1.14
Cyclops C1-C5	80	96	3.56	0.5	13	40.18
Diaptomus C1-C5	31	20	1.03	0.3	31	11.64
Diaptomus sicilis C6	85	105	3.84	0.6	15	43.38
Limnocalanus C6	9	6	0.30	0.1	28	3.42
Canthocamptus C6	1	0	0.02	0.0	141	0.23
MEAN AND STATISTICS BASED ON A AND B COUNTS	208	230	8.85	0.6	7	100.00

Appendix 267. Cont.

Station: LM3-2 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 8 JUL 85
Sample time: 0815 | Vol filtered (m3): 49.5 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: #10 | Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	17	12	37.49	9.1	24	10.43
Diaptomus C1-C5	7	10	21.98	5.5	25	6.12
Diaptomus sicilis C6	121	105	292.20	29.3	10	81.29
Limnocalanus C6	5	1	7.76	7.3	94	2.16
MEAN AND STATISTICS BASED ON A AND B COUNTS	150	128	359.43	40.2	11	100.00

Station: LM3-1 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 11 JUN 85
Sample time: 0802 | Vol filtered (m3): 81.2 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 8

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	2	1	0.15	0.1	47	1.19
Diaptomus sicilis C6	138	109	12.17	2.0	17	98.02
Limnocalanus C6	0	2	0.10	0.1	141	0.79
MEAN AND STATISTICS BASED ON A AND B COUNTS	140	112	12.41	2.0	16	100.00

Station: LM3-2 | Date collected: 28 FEB 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 11 JUN 85
Sample time: 0802 | Vol filtered (m3): 81.2 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 4

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	3	2	0.12	0.0	28	1.48
Diaptomus sicilis C6	136	180	7.83	1.5	19	94.08
Limnocalanus C6	5	7	0.30	0.1	24	3.55
Bosmina	1	0	0.02	0.0	141	0.30
Alona quadrangularis	1	1	0.05	0.0	0	0.59
MEAN AND STATISTICS BASED ON A AND B COUNTS	148	190	8.33	1.5	18	100.00

Appendix 267. Cont.

Station: LM3-1

Date collected: 28 FEB 85

Sample period: D1D
Sample time: 0815
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 80.2
Mesh size: #10

Date examined: 11 JUN 85
Enumerator: MO
Common split factor: 1

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	75		0.94			42.86
Diaptomus C1-C5	15		0.19			8.57
Diaptomus C6	83		1.03			47.43
Limnocalanus C6	2		0.02			1.14
MEAN BASED ON A COUNT ONLY	175		2.18			100.00

Station: LM3-2

Date collected: 28 FEB 85

Sample period: D1D
Sample time: 0815
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 80.2
Mesh size: #10

Date examined: 2 JUL 85
Enumerator: MO
Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	1	2	1.20	0.6	47	0.70
Cyclops C1-C5	27	41	27.13	7.9	29	15.96
Diaptomus C1-C5	15	10	9.98	2.8	28	5.87
Diaptomus sicilis C6	164	151	125.69	7.3	6	73.94
Limnocalanus C6	4	9	5.19	2.8	54	3.05
Canthocamptus C6	0	1	0.40	0.6	141	0.23
Asplanchna	1	0	0.40	0.6	141	0.23
MEAN AND STATISTICS BASED ON A AND B COUNTS	212	214	169.97	1.1	1	100.00

Station: FP3-1

Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1239
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 92.9
Mesh size: # 2

Date examined: 16 JUL 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	8	6	9.64	1.9	20	4.40
Diaptomus sicilis C6	47	60	73.71	12.7	17	33.65
Limnocalanus C1-C5	95	84	123.32	10.7	9	56.29
Limnocalanus C6	11	5	11.02	5.8	53	5.03
Daphnia galeata mendotae	0	2	1.38	1.9	141	0.63
MEAN AND STATISTICS BASED ON A AND B COUNTS	161	157	219.07	3.9	2	100.00

Appendix 267. Cont.

Station: FP3-2 Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1239
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 92.9
Mesh size: # 2

Date examined: 16 JUL 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	5	8	8.96	2.9	33	3.83
Diaptomus sicilis C6	78	69	101.27	8.8	9	43.36
Limnocalanus C1-C5	86	82	115.74	3.9	3	49.56
Limnocalanus C6	3	3	4.13	0.0	0	1.77
Canthocamptus C1-C5	0	1	0.69	1.0	141	0.29
Chydorus	3	0	2.07	2.9	141	0.88
Daphnia galeata mendotae	1	0	0.69	1.0	141	0.29
MEAN AND STATISTICS BASED ON A AND B COUNTS	176	163	233.54	12.7	5	100.00

Station: FP3-1 Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1247
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.9
Mesh size: #10

Date examined: 12 JUL 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	80	75	146.10	6.7	5	42.23
Cyclops bicuspidatus thomasi C6	3	2	4.71	1.3	28	1.36
Diaptomus C1-C5	8	7	14.14	1.3	9	4.09
Diaptomus sicilis C6	61	50	104.62	14.7	14	30.25
Limnocalanus C1-C5	28	26	50.90	2.7	5	14.71
Limnocalanus C6	6	5	10.37	1.3	13	3.00
Canthocamptus C1-C5	2	1	2.83	1.3	47	0.82
Bosmina	2	1	2.83	1.3	47	0.82
Chydorus	3	1	3.77	2.7	71	1.09
Daphnia galeata mendotae	1	2	2.83	1.3	47	0.82
Holopedium	2	1	2.83	1.3	47	0.82
MEAN AND STATISTICS BASED ON A AND B COUNTS	196	171	345.92	33.3	10	100.00

Appendix 267. Cont.

Station: FP3-2

Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1247
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.9
Mesh size: #10

Date examined: 12 JUL 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	43	54	91.43	14.7	16	23.72
Cyclops C1-C5	8	10	16.97	2.7	16	4.40
Cyclops bicuspidatus thomasi C6	6	4	9.43	2.7	28	2.44
Diaptomus C1-C5	21	18	36.76	4.0	11	9.54
Diaptomus sicilis C6	80	81	151.75	1.3	1	39.36
Limnocalanus C1-C5	26	26	49.01	0.0	0	12.71
Limnocalanus C6	3	6	8.48	4.0	47	2.20
Canthocamptus C1-C5	3	4	6.60	1.3	20	1.71
Bosmina	2	4	5.66	2.7	47	1.47
Chydorus	2	2	3.77	0.0	0	0.98
Daphnia galeata mendotae	2	2	3.77	0.0	0	0.98
Holopedium	1	0	0.94	1.3	141	0.24
Senecella calanoides C1-C6	1	0	0.94	1.3	141	0.24
MEAN AND STATISTICS BASED ON A AND B COUNTS	198	211	385.51	17.3	4	100.00

Station: FP3-1

Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1239
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 71.0
Mesh size: # 2

Date examined: 11 JUL 85
Enumerator: MO
Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	2	5	3.15	1.9	61	1.87
Diaptomus sicilis C6	91	96	84.28	3.2	4	49.87
Epischura C1-C5	0	1	0.45	0.6	141	0.27
Limnocalanus C1-C5	71	88	71.66	10.8	15	42.40
Limnocalanus C6	6	7	5.86	0.6	11	3.47
Bosmina	0	2	0.90	1.3	141	0.53
Chydorus	2	2	1.80	0.0	0	1.07
Daphnia galeata mendotae	1	1	0.90	0.0	0	0.53
MEAN AND STATISTICS BASED ON A AND B COUNTS	173	202	169.01	18.5	11	100.00

Appendix 267. Cont.

Station: FP3-2 | Date collected: 2 JUN 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 11 JUL 85
Sample time: 1239 | Vol filtered (m3): 71.0 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	1	2	1.35	0.6	47	0.74
Cyclops bicuspidatus thomasi C6	2	0	0.90	1.3	141	0.49
Diaptomus C1-C5	7	6	5.86	0.6	11	3.21
Diaptomus sicilis C6	112	98	94.65	8.9	9	51.85
Limnocalanus C1-C5	68	76	64.90	5.1	8	35.56
Limnocalanus C6	10	11	9.46	0.6	7	5.19
Bosmina	0	1	0.45	0.6	141	0.25
Chydorus	1	1	0.90	0.0	0	0.49
Daphnia galeata mendotae	4	3	3.15	0.6	20	1.73
Holopedium	1	0	0.45	0.6	141	0.25
Polyphemus	1	0	0.45	0.6	141	0.25
MEAN AND STATISTICS BASED ON A AND B COUNTS	207	198	182.54	5.7	3	100.00

Station: FP3-1 | Date collected: 2 JUN 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 12 JUL 85
Sample time: 1247 | Vol filtered (m3): 51.9 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: #10 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	89	69	97.42	17.4	18	38.16
Cyclops C1-C5	3	4	4.32	0.9	20	1.69
Cyclops bicuspidatus thomasi C6	8	6	8.63	1.7	20	3.38
Diaptomus C1-C5	15	22	22.81	6.1	27	8.94
Diaptomus sicilis C6	63	60	75.84	2.6	3	29.71
Limnocalanus C1-C5	31	25	34.53	5.2	15	13.53
Limnocalanus C6	4	3	4.32	0.9	20	1.69
Canthocamptus C1-C5	2	0	1.23	1.7	141	0.48
Canthocamptus C6	2	1	1.85	0.9	47	0.72
Bosmina	1	2	1.85	0.9	47	0.72
Chydorus	1	1	1.23	0.0	0	0.48
Daphnia galeata mendotae	1	1	1.23	0.0	0	0.48
MEAN AND STATISTICS BASED ON A AND B COUNTS	220	194	255.26	22.7	9	100.00

Appendix 267. Cont.

Station: FP3-2 Date collected: 2 JUN 85

Sample period: D1D
Sample time: 1247
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 51.9
Mesh size: #10

Date examined: 12 JUL 85
Enumerator: MO
Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	71	95	102.35	20.9	20	40.10
Cyclops C1-C5	10	15	15.41	4.4	28	6.04
Cyclops bicuspidatus thomasi C6	4	7	6.78	2.6	39	2.66
Diaptomus C1-C5	19	15	20.96	3.5	17	8.21
Diaptomus sicilis C6	53	45	60.42	7.0	12	23.67
Limnocalanus C1-C5	33	31	39.46	1.7	4	15.46
Limnocalanus C6	2	1	1.85	0.9	47	0.72
Canthocamptus C1-C5	5	3	4.93	1.7	35	1.93
Bosmina	1	1	1.23	0.0	0	0.48
Chydorus	1	1	1.23	0.0	0	0.48
Senecella calanoides C1-C6	1	0	0.62	0.9	141	0.24
MEAN AND STATISTICS BASED ON A AND B COUNTS	200	214	255.26	12.2	5	100.00

Station: LN3-1 Date collected: 5 JUN 85

Sample period: D1D
Sample time: 1511
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.1
Mesh size: # 2

Date examined: 12 SEP 85
Enumerator: MO
Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	8	7	7.15	0.7	9	5.26
Diaptomus sicilis C6	102	96	94.43	4.0	4	69.47
Limnocalanus C1-C5	30	30	28.61	0.0	0	21.05
Limnocalanus C6	2	2	1.91	0.0	0	1.40
Senecella calanoides C1-C5	2	2	1.91	0.0	0	1.40
Daphnia pulex	2	2	1.91	0.0	0	1.40
MEAN AND STATISTICS BASED ON A AND B COUNTS	146	139	135.92	4.7	3	100.00

Appendix 267. Cont.

Station: LN3-2 Date collected: 5 JUN 85

Sample period: D1D
Sample time: 1511
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.1
Mesh size: # 2

Date examined: 8 OCT 85
Enumerator: MO
Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	2	2	1.91	0.0	0	1.13
Diaptomus sicilis C6	151	169	152.61	12.1	8	90.65
Epischura C1-C5	2	3	2.38	0.7	28	1.42
Limnocalanus C6	2	1	1.43	0.7	47	0.85
Bosmina	4	3	3.34	0.7	20	1.98
Chydorus	1	1	0.95	0.0	0	0.57
Holopedium	0	1	0.48	0.7	141	0.28
Senecella calanoides C1-C5	1	1	0.95	0.0	0	0.57
Daphnia pulex	5	4	4.29	0.7	16	2.55
MEAN AND STATISTICS BASED ON A AND B COUNTS	168	185	168.35	11.5	7	100.00

Station: LN3-1 Date collected: 5 JUN 85

Sample period: D1D
Sample time: 1533
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.1
Mesh size: #10

Date examined: 8 OCT 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	102	81	174.55	28.3	16	42.66
Cyclops C1-C5	15	8	21.94	9.4	43	5.36
Cyclops bicuspidatus thomasi C6	10	9	18.12	1.3	7	4.43
Diaptomus C1-C5	12	10	20.98	2.7	13	5.13
Diaptomus sicilis C6	57	45	97.29	16.2	17	23.78
Epischura C1-C5	2	2	3.82	0.0	0	0.93
Limnocalanus C1-C5	27	27	51.51	0.0	0	12.59
Limnocalanus C6	2	1	2.86	1.3	47	0.70
Bosmina	4	4	7.63	0.0	0	1.86
Daphnia galeata mendotae	2	1	2.86	1.3	47	0.70
Polyphemus	1	0	0.95	1.3	141	0.23
Daphnia pulex	4	2	5.72	2.7	47	1.40
Senecella calanoides C1-C5	0	1	0.95	1.3	141	0.23
MEAN AND STATISTICS BASED ON A AND B COUNTS	238	191	409.18	63.4	15	100.00

Appendix 267. Cont.

Station: LN3-2

Date collected: 5 JUN 85

Sample period: D1D
Sample time: 1533
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 67.1
Mesh size: #10

Date examined: 8 OCT 85
Enumerator: MO
Common split factor: 128

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	40	60	95.38	27.0	28	29.85
Cyclops C1-C5	10	11	20.03	1.3	7	6.27
Cyclops bicuspidatus thomasi C6	8	8	15.26	0.0	0	4.78
Diaptomus C1-C5	12	10	20.98	2.7	13	6.57
Diaptomus sicilis C6	51	42	88.70	12.1	14	27.76
Epischura C1-C5	3	2	4.77	1.3	28	1.49
Limnocalanus C1-C5	31	30	58.18	1.3	2	18.21
Bosmina	1	7	7.63	8.1	106	2.39
Daphnia galeata mendotae	3	2	4.77	1.3	28	1.49
Daphnia pulex	2	1	2.86	1.3	47	0.90
Senecella calanoides C1-C5	0	1	0.95	1.3	141	0.30
MEAN AND STATISTICS BASED ON A AND B COUNTS	161	174	319.52	17.5	5	100.00

Station: LN3-1

Date collected: 5 JUN 85

Sample period: D1D
Sample time: 1511
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 57.1
Mesh size: # 2

Date examined: 7 OCT 85
Enumerator: MO
Common split factor: 16

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	2	1	0.42	0.2	47	0.82
Diaptomus sicilis C6	168	115	39.65	10.5	26	77.32
Limnocalanus C1-C5	37	31	9.53	1.2	12	18.58
Limnocalanus C6	2	2	0.56	0.0	0	1.09
Chydorus	2	2	0.56	0.0	0	1.09
Polyphemus	1	0	0.14	0.2	141	0.27
Senecella calanoides C1-C5	3	0	0.42	0.6	141	0.82
MEAN AND STATISTICS BASED ON A AND B COUNTS	215	151	51.28	12.7	25	100.00

Appendix 267. Cont.

Station: LN3-2 | Date collected: 5 JUN 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 13 SEP 85
Sample time: 1511 | Vol filtered (m3): 57.1 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: # 2 | Common split factor: 32

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Diaptomus C1-C5	8	7	4.20	0.4	9	5.15
Diaptomus sicilis C6	110	84	54.36	10.3	19	66.67
Limnocalanus C1-C5	25	24	13.73	0.4	3	16.84
Bosmina	6	5	3.08	0.4	13	3.78
Chydorus	2	2	1.12	0.0	0	1.37
Polyphemus	2	1	0.84	0.4	47	1.03
Senecella calanoides C1-C5	8	7	4.20	0.4	9	5.15
MEAN AND STATISTICS BASED ON A AND B COUNTS	161	130	81.54	12.3	15	100.00

Station: LN3-1 | Date collected: 5 JUN 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 8 OCT 85
Sample time: 1533 | Vol filtered (m3): 57.1 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: #10 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	162	161	181.02	0.8	0	57.99
Cyclops C1-C5	8	12	11.21	3.2	28	3.59
Cyclops bicuspidatus thomasi C6	17	16	18.49	0.8	4	5.92
Diaptomus C1-C5	14	11	14.01	2.4	17	4.49
Diaptomus sicilis C6	46	50	53.80	3.2	6	17.24
Limnocalanus C1-C5	19	22	22.98	2.4	10	7.36
Limnocalanus C6	2	0	1.12	1.6	141	0.36
Canthocamptus C1-C5	2	1	1.68	0.8	47	0.54
Chydorus	1	0	0.56	0.8	141	0.18
Daphnia galeata mendotae	2	0	1.12	1.6	141	0.36
Polyphemus	1	1	1.12	0.0	0	0.36
Daphnia pulex	4	3	3.92	0.8	20	1.26
Senecella calanoides C1-C5	0	2	1.12	1.6	141	0.36
MEAN AND STATISTICS BASED ON A AND B COUNTS	278	279	312.15	0.8	0	100.00

Appendix 267. Cont.

Station: LN3-2 | Date collected: 5 JUN 85

Sample period: D1D | Station depth (m): 3.0 | Date examined: 8 OCT 85
Sample time: 1533 | Vol filtered (m3): 57.1 | Enumerator: MO
Sample depth (m): 3.0 | Mesh size: #10 | Common split factor: 64

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	124	132	143.47	6.3	4	60.24
Cyclops C1-C5	4	6	5.60	1.6	28	2.35
Cyclops bicuspidatus thomasi C6	21	17	21.30	3.2	15	8.94
Diaptomus C1-C5	9	7	8.97	1.6	18	3.76
Diaptomus sicilis C6	29	27	31.38	1.6	5	13.18
Epischura C1-C5	3	2	2.80	0.8	28	1.18
Limnocalanus C1-C5	11	16	15.13	4.0	26	6.35
Limnocalanus C6	1	1	1.12	0.0	0	0.47
Bosmina	4	4	4.48	0.0	0	1.88
Chydorus	1	2	1.68	0.8	47	0.71
Polyphemus	0	2	1.12	1.6	141	0.47
Daphnia pulex	1	0	0.56	0.8	141	0.24
Senecella calanoides C1-C5	0	1	0.56	0.8	141	0.24
MEAN AND STATISTICS BASED ON A AND B COUNTS	208	217	238.18	7.1	3	100.00

Station: LM3-1 | Date collected: 11 JUN 85

Sample period: D1D | Station depth (m): '3.0 | Date examined: 14 OCT 85
Sample time: 1757 | Vol filtered (m3): 41.9 | Enumerator: MO
Sample depth (m): 1.5 | Mesh size: # 2 | Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	11	12	0.55	0.0	6	7.99
Diaptomus C1-C5	23	28	1.22	0.2	14	17.71
Diaptomus C6	15	20	0.84	0.2	20	12.15
Diaptomus sicilis C6	15	20	0.84	0.2	20	12.15
Limnocalanus C1-C5	17	18	0.84	0.0	4	12.15
Bosmina	26	21	1.12	0.2	15	16.32
Ceriodaphnia	6	5	0.26	0.0	13	3.82
Chydorus	1	0	0.02	0.0	141	0.35
Daphnia galeata mendotae	2	2	0.10	0.0	0	1.39
Daphnia retrocurva	10	11	0.50	0.0	7	7.29
Diaphanosoma	2	2	0.10	0.0	0	1.39
Holopedium	2	1	0.07	0.0	47	1.04
Leptodora	1	0	0.02	0.0	141	0.35
Asplanchna	4	3	0.17	0.0	20	2.43
Daphnia pulex	3	2	0.12	0.0	28	1.74
Eurycercus	3	2	0.12	0.0	28	1.74
MEAN AND STATISTICS BASED ON A AND B COUNTS	141	147	6.87	0.2	3	100.00

Appendix 267. Cont.

Station: LM3-2 — Date collected: 11 JUN 85

Sample period: D1D — Station depth (m): 3.0 — Date examined: 14 OCT 85
Sample time: 1757 — Vol filtered (m3): 41.9 — Enumerator: MO
Sample depth (m): 1.5 — Mesh size: # 2 — Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	14	15	0.69	0.0	5	25.22
Cyclops vernalis C6	1	0	0.02	0.0	141	0.87
Diaptomus C1-C5	6	5	0.26	0.0	13	9.57
Diaptomus sicilis C6	7	4	0.26	0.1	39	9.57
Epischura C1-C5	2	1	0.07	0.0	47	2.61
Epischura C6	2	0	0.05	0.1	141	1.74
Eurytemora C6	0	1	0.02	0.0	141	0.87
Limnocalanus C1-C5	4	6	0.24	0.1	28	8.70
Ceriodaphnia	6	4	0.24	0.1	28	8.70
Chydorus	1	0	0.02	0.0	141	0.87
Daphnia retrocurva	15	9	0.57	0.2	35	20.87
Holopedium	2	1	0.07	0.0	47	2.61
Diaphanosoma	2	1	0.07	0.0	47	2.61
Eurycercus	1	2	0.07	0.0	47	2.61
Daphnia pulex	2	1	0.07	0.0	47	2.61
MEAN AND STATISTICS BASED ON A AND B COUNTS	65	50	2.74	0.5	18	100.00

Station: LM3-1 — Date collected: 11 JUN 85

Sample period: D1D — Station depth (m): 3.0 — Date examined: 11 OCT 85
Sample time: 1805 — Vol filtered (m3): 39.9 — Enumerator: MO
Sample depth (m): 1.5 — Mesh size: #10 — Common split factor: 32

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	48	39	34.89	5.1	15	21.80
Cyclops C1-C5	102	95	79.00	4.0	5	49.37
Cyclops bicuspidatus thomasi C6	5	2	2.81	1.7	61	1.75
Cyclops vernalis C6	2	2	1.60	0.0	0	1.00
Diaptomus C1-C5	14	14	11.23	0.0	0	7.02
Eurytemora C1-C5	2	1	1.20	0.6	47	0.75
Limnocalanus C1-C5	1	0	0.40	0.6	141	0.25
Bosmina	16	19	14.04	1.7	12	8.77
Ceriodaphnia	1	1	0.80	0.0	0	0.50
Daphnia retrocurva	5	6	4.41	0.6	13	2.76
Holopedium	1	1	0.80	0.0	0	0.50
Asplanchna	9	10	7.62	0.6	7	4.76
Eurycercus	1	2	1.20	0.6	47	0.75
MEAN AND STATISTICS BASED ON A AND B COUNTS	207	192	160.00	8.5	5	100.00

Appendix 267. Cont.

Station: LM3-2 | Date collected: 11 JUN 85

Sample period: D1D
Sample time: 1805
Sample depth (m): 1.5

Station depth (m): 3.0
Vol filtered (m3): 39.9
Mesh size: #10

Date examined: 11 OCT 85
Enumerator: MO
Common split factor: 32

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	25	32	22.86	4.0	17	10.98
Cyclops C1-C5	181	158	135.94	13.0	10	65.32
Cyclops C6	2	1	1.20	0.6	47	0.58
Cyclops vernalis C6	2	2	1.60	0.0	0	0.77
Diaptomus C1-C5	18	17	14.04	0.6	4	6.74
Epischura C1-C5	0	1	0.40	0.6	141	0.19
Eurytemora C1-C5	1	1	0.80	0.0	0	0.39
Canthocamptus C1-C5	0	1	0.40	0.6	141	0.19
Bosmina	18	28	18.45	5.7	31	8.86
Chydorus	1	2	1.20	0.6	47	0.58
Daphnia retrocurva	5	5	4.01	0.0	0	1.93
Diaphanosoma	1	0	0.40	0.6	141	0.19
Asplanchna	8	9	6.82	0.6	8	3.28
MEAN AND STATISTICS BASED ON A AND B COUNTS	262	257	208.12	2.8	1	100.00

Station: LM3-1 | Date collected: 11 JUN 85

Sample period: D1D
Sample time: 1757
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 39.2
Mesh size: # 2

Date examined: 1 JAN 18
Enumerator: DEC
Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	28	27	1.40	0.0	3	31.43
Cyclops vernalis C6	1	1	0.05	0.0	0	1.14
Diaptomus C1-C5	15	12	0.69	0.1	16	15.43
Diaptomus sicilis C6	3	1	0.10	0.1	71	2.29
Limnocalanus C1-C5	2	2	0.10	0.0	0	2.29
Limnocalanus C6	0	1	0.03	0.0	141	0.57
Mesocyclops C6	3	2	0.13	0.0	28	2.86
Daphnia pulex	1	3	0.10	0.1	71	2.29
Bosmina	2	3	0.13	0.0	28	2.86
Ceriodaphnia	4	3	0.18	0.0	20	4.00
Chydorus	3	0	0.08	0.1	141	1.71
Daphnia retrocurva	19	19	0.97	0.0	0	21.71
Diaphanosoma	9	7	0.41	0.1	18	9.14
Asplanchna	1	0	0.03	0.0	141	0.57
Eurycercus	2	1	0.08	0.0	47	1.71
MEAN AND STATISTICS BASED ON A AND B COUNTS	93	82	4.46	0.4	9	100.00

Appendix 267. Cont.

Station: LM3-2

Sample period: D1D
Sample time: 1757
Sample depth (m): 3.0

Date collected: 11 JUN 85

Station depth (m): 3.0
Vol filtered (m3): 39.2
Mesh size: # 2

Date examined: 11 OCT 85
Enumerator: MO
Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	7	9	0.41	0.1	18	18.82
Cyclops vernalis C6	1	0	0.03	0.0	141	1.18
Diaptomus C1-C5	7	8	0.38	0.0	9	17.65
Diaphanosoma	2	4	0.15	0.1	47	7.06
Eurycercus	1	0	0.03	0.0	141	1.18
Limnocalanus C1-C5	7	6	0.33	0.0	11	15.29
Bosmina	4	3	0.18	0.0	20	8.24
Ceriodaphnia	1	1	0.05	0.0	0	2.35
Daphnia retrocurva	8	10	0.46	0.1	16	21.18
Holopedium	1	1	0.05	0.0	0	2.35
Daphnia pulex	2	1	0.08	0.0	47	3.53
Mesocyclops C1-C5	1	0	0.03	0.0	141	1.18
MEAN AND STATISTICS BASED ON A AND B COUNTS	42	43	2.17	0.0	2	100.00

Station: LM3-1

Sample period: D1D
Sample time: 1805
Sample depth (m): 3.0

Date collected: 11 JUN 85

Station depth (m): 3.0
Vol filtered (m3): 37.3
Mesh size: #10

Date examined: 14 OCT 85
Enumerator: MO
Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Cyclops C1-C5	66	78	3.86	0.5	12	81.82
Cyclops bicuspidatus thomasi C6	2	3	0.13	0.0	28	2.84
Diaptomus C1-C5	5	7	0.32	0.1	24	6.82
Bosmina	4	6	0.27	0.1	28	5.68
Diaphanosoma	3	2	0.13	0.0	28	2.84
MEAN AND STATISTICS BASED ON A AND B COUNTS	80	96	4.72	0.6	13	100.00

Appendix 267. Cont.

Station: LM3-2

Date collected: 11 JUN 85

Sample period: D1D
Sample time: 1805
Sample depth (m): 3.0

Station depth (m): 3.0
Vol filtered (m3): 37.3
Mesh size: #10

Date examined: 14 OCT 85
Enumerator: MD
Common split factor: 2

TAXON NAME	A	B	MEAN (#/m3)	STD DEV	CV (%)	% COMP
Copepod nauplii	5	8	0.35	0.1	33	2.42
Cyclops C1-C5	231	246	12.79	0.6	4	88.83
Cyclops bicuspidatus thomasi C6	8	6	0.38	0.1	20	2.61
Diaptomus C1-C5	2	2	0.11	0.0	0	0.74
Daphnia retrocurva	1	1	0.05	0.0	0	0.37
Eucyclops agilis C6	1	1	0.05	0.0	0	0.37
Diaphanosoma	1	1	0.05	0.0	0	0.37
Canthocamptus C1-C5	1	0	0.03	0.0	141	0.19
Bosmina	8	7	0.40	0.0	9	2.79
Ceriodaphnia	1	0	0.03	0.0	141	0.19
Chydorus	0	1	0.03	0.0	141	0.19
Asplanchna	1	2	0.08	0.0	47	0.56
Eurycercus	1	1	0.05	0.0	0	0.37
MEAN AND STATISTICS BASED ON A AND B COUNTS	261	276	14.40	0.6	4	100.00

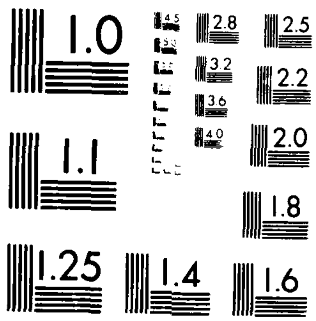
END
DATE
FILMED
8-88
DTIC

AD-A195 491 DRIFT OF ZOOPLANKTON BENTHOS AND LARVAL FISH AND DISTRIBUTION OF MACROPHY..(U) MICHIGAN UNIV ANN ARBOR GREAT LAKES RESEARCH DIV D J JUDE ET AL. JAN 86

7/7

UNCLASSIFIED DACW35-85-C-0005 F/G 8/1 NL

END
DATE
FILMED
89



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SUPPLEMENTARY

INFORMATION

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

DTIC FILE COPY

AD-A195 491

DTIC ELECTE DEC 3 0 1988 S E D

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) DACW 35-85-C-0005	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Great Lakes Research Division; 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) The University of Michigan Ann Arbor, Michigan 48109	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Corps of Engineers; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER DACW 35-85-C-0005
8c. ADDRESS (City, State, and ZIP Code) Detroit District P.O. Box 1027 Detroit, Michigan 48231	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Drift of Zooplankton, Benthos, and Larval Fish and Distribution of Macrophytes and Larval Fish During Winter and Summer, 1985.

12. PERSONAL AUTHOR(S)
Jude, D.J., Winnel, M., Evans, M.S., Tesar, E.J. and Futyma, R.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM ____ TO ____	January 1986	528

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Zooplankton, benthos, macrophytes, seston, larval fish, detritus ice, drift, winter Ichthyoplankton, zooplankton extinction coef.

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The purpose of this report was to gain sufficient data to predict the impact of winter shipping, as late as 15 February on three components of the St. Marys River; the macrophyte community, the drifting benthos and zooplankton community, and the larval fish community.

A Ponar grab-sampler was used to secure river bottom samples at five sites chosen in each of the following portions of the St. Marys River: 1) Mosquito Bay, 2) Lake Nicolet, 3) western Lake Munuscong, 4) eastern Lake Munuscong and 5) the Raber-Maud Bay area. Aquatic macrophyte samples and light measurements were taken during July and August of 1985. Aquatic macrophyte distribution was related to the degree of light penetration and the substrate type. Samples of macrophytic, zooplanktonic, benthic, fish larvae, and fish egg drift were collected during a period of ice cover (23 February - 7 March 1985) and during a period

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Thomas Freitag	22b. TELEPHONE (Include Area Code) (313) 226-7590; 22c. OFFICE SYMBOL CENCE-PD-EA

DD Form 1473, JUN 86   Previous editions are obsolete.   SECURITY CLASSIFICATION OF THIS PAGE

88 12 29 074

19 (continued).

free of ice (2-14 June 1985). No detectable increase in the density of drifting benthos was noted in ship passage studies.

Zooplankton abundances varied significantly along the course of the river. It was not clear whether winter navigation had any effect on the zooplankton community. Ice breaking could dislodge spawned eggs. Eggs spawned in deeper substrates or deposited in the interstices of rocks are not affected by winter vessel passage.